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Ontario Legislative Research
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SESSIONAL PAPERS

Volume XXXVII. Part V.

First Session of Eleventh Legislature

OF THE

PROVINCE OF ONTARIO

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SESSION 1905

TORONTO:
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1905

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LIST OF SESSIONAL PAPERS.

PRESENTED TO THE HOUSE DURING SESSION.

ARRANGED ALPHABETICALLY.

TITLE.	No.	REMARKS.
Accounts, Public	1	*Printed.*
Agricultural College, Report	14	"
Agricultural and Experimental Union, Report	15	"
Archives, Report	49	"
Asylums, Report	38	"
Bee-Keepers' Association, Report	20	*Printed.*
Births, Marriages and Deaths, Report	9	"
Blind Institute, Report	41	"
Boundaries extension, correspondence	50	*Not printed.*
Bush, George, correspondence	53	"
Children, Neglected, Report	43	*Printed.*
Cohoe, correspondence *re* appointment	55	*Not printed.*
Crown Lands, Report	3	*Printed.*
Dairymen's Association, Report	22	*Printed.*
Deaf and Dumb Institute, Report	42	"
Division Courts, Report	33	"
Education, Report	12	*Printed.*
Education Department, Orders-in-Council	57	*Printed for Distribution only.*
Elections, Return from Records of General	46	*Printed.*
Entomological Society, Report	19	"
Estimates, 1905	2	"
Factories, Report	8	*Printed.*
Fairs and Exhibitions, Report	26	"
Farmers' Institutes, Report	25	"
Fisheries, Report	31	"
Forestry, Report	4	"
Fruit Experiment Stations, Report	17	"
Fruit Growers' Association, Report	16	"
Fumigation Appliances, Report	18	"
Game Commission, Report	30	*Printed.*
Gaols, Prisons, Report	39	"
Good Roads, Report	27	"
Health, Report	36	*Printed.*
Highways, Report	27	"
Hospitals and Charities, Report	40	"

TITLE.	No.	REMARKS.
Indian Claims, North West Angle Treaty No. 3.	61	*Printed.*
Industries, Report	28	"
Insurance, Report	10	"
James Bay Railway route, correspondence	58	*Not printed.*
Judicature Act, Orders-in-Council	51	"
Labour, Report	29	*Printed.*
Legal Offices, Report	34	"
Librarian, Report	47	*Not printed.*
Liquor Licenses, Report of inspection	44	*Printed.*
Liquor Licenses Act, enforcement in N. Hastings	52	*Not printed.*
Liquor License Commissioners, appointment of, in E. Lambton	60	"
Live Stock Associations, Report	23	*Printed.*
Live Stock Registrar, Report	24	"
Loan Corporations, Report	11	"
Lunatic Asylums, Report	38	"
Mines, Report	5	*Printed.*
Mining Divisions, revised Regulations	56	*Printed.*
North West Angle Treaty No. 3, Indian Claims	61	*Printed for Distribution only.*
Prisons and Reformatories, Report	39	*Printed.*
Provincial Municipal Auditor, Report	45	"
Public Accounts, 1904	1	"
Public Works, Report	7	"
Queen Victoria Niagara Falls Park, Report	6	*Printed.*
Railway Legislation in U. States, Report	54	*Printed.*
Registrar-General, Report	9	"
Registry Offices, Report	35	"
River aux Raisin, drainage, correspondence	62	*Not printed.*
Road Making, Report	27	*Printed.*
School Practical Science, calendar	21	*Printed for Distribution only.*
Secretary and Registrar, Report	37	*Printed.*
Statute Distribution, Statement of	59	*Not printed.*
Temiskaming and Northern Ontario Railway, Report	48	*Printed.*
Toronto University, Report	13	"
Toronto University, Report of Commission	32	"

LIST OF SESSIONAL PAPERS.

Arranged in Numerical Order with their Titles at full length; the dates when Ordered and when presented to the Legislature; the name of the Member who moved the same, and whether Ordered to be Printed or not.

CONTENTS OF PART I.

No. 1. Public Accounts of the Province for the year 1904. Presented to the Legislature, March 31st, 1905. *Printed.*

No. 2. Estimates for the service of the Province until the Estimates of the year are finally passed. Presented to the Legislature, 23rd March, 1905. *Not Printed.* Estimates for the year 1905. Presented to the Legislature, 7th April, 1905. *Printed.* Estimates (Supplementary) for the year 1905. Presented to the Legislature, 18th May, 1905. *Printed.*

No. 3. Report of the Commissioner of Crown Lands for the year 1904. Presented to the Legislature, 17th May, 1905. *Printed.*

No. 4. Report of the Clerk of Forestry for the year 1904. Presented to the Legislature, 17th May, 1905. *Printed.*

CONTENTS OF PART II.

No. 5. Report of the Bureau of Mines for the year 1904. Presented to the Legislature, 6th April, 1905. *Printed.*

No. 6. Report of the Commissioners of the Queen Victoria Niagara Falls Park, for the year 1904. Presented to the Legislature, 31st March, 1905. *Printed.*

No. 7. Report of the Commissioner of Public Works for the year 1904 Presented to the Legislature, 31st March, 1905. *Printed.*

No. 8. Report of the Inspectors of Factories for the year 1904. Presented to the Legislature, 15th May, 1905. *Printed.*

No. 9. Report relating to the registration of Births, Marriages and Deaths for the year 1903. Presented to the Legislature, 31st March 1905. *Printed.*

CONTENTS OF PART III.

No. 10. Report of the Inspector of Insurance for the year 1904. Presented to the Legislature, 7th April, 1905. *Printed.*

CONTENTS OF PART IV.

No. 11. Loan Corporations, Statements by Building Societies, Loan and other Companies, for the year 1904. Presented to the Legislature, 3rd May, 1905. *Printed.*

No. 12. Report of the Minister of Education, for the year 1904 with the Statistics of 1903. Presented to the Legislature, 17th May, 1905. *Printed.*

No. 13. Auditors' Report to the Board of Trustees, University of Toronto, on Capital and Income Accounts, for the year ending 30th June, 1904. Presented to the Legislature, 17th May, 1905. *Printed.*

No. 14. Report of the Ontario Agricultural College and Experimental Farm, for the year 1904. Presented to the Legislature, 17th May, 1905. *Printed.*

CONTENTS OF PART V.

No. 15. Report of the Ontario Agricultural and Experimental Union of the Province, for the year 1904. Presented to the Legislature, 3rd April, 1905. *Printed.*

No. 16. Report of the Fruit Growers' Association of the Province, for the year 1904. Presented to the Legislature, 12th April, 1905. *Printed.*

No. 17. Report of the Fruit Experiment Stations of the Province, for the year 1904. Presented to the Legislature, 10th May, 1905. *Printed.*

No. 18. Report of the Inspector of Fumigation Appliances of the Province, for the year 1904. Presented to the Legislature, 15th May. 1905. *Printed.*

No. 19. Report of the Entomological Society, for the year 1904. Presented to the Legislature, 3rd April, 1905. *Printed.*

CONTENTS OF PART VI.

No. 20. Report of the Bee-Keepers' Association of the Province, for the year 1904. Presented to the Legislature, 12th April, 1905. *Printed.*

No. 21. Calendar of the Ontario School of Practical Science, affiliated with the University of Toronto. Presented to the Legislature, 3rd May, 1905. *Printed for distribution only.*

No. 22. Reports of the Dairymen's Associations of the Province, for the year 1904. Presented to the Legislature, 11th April, 1905. *Printed.*

No. 23. Reports of the Live Stock Associations of the Province, for the year 1904. Presented to the Legislature, 15th May, 1905. *Printed.*

No. 24. Report of the Registrar of Live Stock of the Province, for the year 1904. Presented to the Legislature, 15th May, 1905. *Printed.*

CONTENTS OF PART VII.

No. 25. Report of the Farmers' Institutes of the Province, for the year 1904. Presented to the Legislature, 14th April, 1905. *Printed.*

No. 26. Report of Ontario Fairs and Exhibitions of the Province, for the year 1904. Presented to the Legislature, 3rd May, 1905. *Printed.*

No. 27. Report of the Commissioner of Highways, for the year 1904. Presented to the Legislature, 12th April, 1905. *Printed.*

No. 28. Report of the Bureau of Industries of the Province, for the year 1904. Presented to the Legislature, 15th May, 1905. *Printed.*

CONTENTS OF PART VIII.

No. 29. Report of the Bureau of Labour, for the year 1904. Presented to the Legislature, 17th May, 1905. *Printed.*

No. 30. Report of the Ontario Game Commission, for the year 1904. Presented to the Legislature, 9th May, 1905. *Printed.*

No. 31. Report of the Department of Fisheries, for the year 1903. Presented to the Legislature, 3rd April, 1905.

No. 32. Report of Commission appointed to enquire into and report upon the matters referred to in a Resolution of the Senate of the University of Toronto, passed on the 20th January, 1905. Presented to the Legislature, 23rd May, 1905. *Printed.*

No. 33. Report of the Inspector of Division Courts, for the year 1904. Presented to the Legislature, 3rd May, 1905. *Printed.*

No. 34. Report of the Inspector of Legal Offices, for the year 1904. Presented to the Legislature, 3rd April, 1905. *Printed.*

No. 35. Report of the Inspector of Registry Offices, for the year 1904. Presented to the Legislature, 18th May, 1905. *Printed.*

CONTENTS OF PART IX.

No. 36. Report of the Provincial Board of Health, for the year 1904. Presented to the Legislature, 31st March, 1905. *Printed.*

No. 37. Report of the Secretary and Registrar of the Province, for the year 1904. Presented to the Legislature, 18th May, 1905. *Printed.*

No. 38. Report upon the Lunatic and Idiot Asylums of the Province, for the year ending 30th September, 1904. Presented to the Legislature, 17th May, 1905. *Printed.*

No. 39. Report upon the Prisons and Reformatories of the Province, for the year ending 30th September, 1904. Presented to the Legislature, 17th May, 1905. *Printed.*

No. 40. Report upon the Hospitals and Charities of the Province, for the year ending 30th September, 1904. Presented to the Legislature, 17th, May, 1905. *Printed.*

CONTENTS OF PART X.

No. 41. Report upon the Institution for the Education of the Blind, Brantford, for the year ending 30th September, 1904. Presented to the Legislature, 6th April, 1905. *Printed.*

No. 42. Report upon the Institution for the Education of the Deaf and Dumb, Belleville, for the year ending 30th September, 1904. Presented to the Legislature, 31st March, 1905. *Printed.*

No. 43. Report of Superintendent. Neglected and Dependent Children of Ontario, for the year 1904. Presented to the Legislature, 18th May, 1905. *Printed.*

No. 44. Report upon the Inspection of Liquor Licenses, for the year 1904. Presented to the Legislature, 17th May, 1905. *Printed.*

No. 45. Report of the Provincial Municipal Auditor for the year 1904. Presented to the Legislature, 15th May, 1905. *Printed.*

No. 46. Return from the Records of the General and Subsequent Elections to the Legislative Assembly on 25th January, and 21st February, 1905, shewing:—(1) The number of Votes polled for each Candidate in each Electoral District in which there was a contest. (2) The majority whereby each successful Candidate was returned. (3) The total number of votes polled in each District (4) The number of Votes remaining Unpolled. (5) The number of names on the Voters' Lists in each District. (6) The population of each District as shewn by the last Dominion Census. (7) Similar Statements as to any Elections held since the General Election. (8) A General Summary of Votes cast in each Electoral District. Presented to the Legislature, 22nd March, 1905. *Printed.*

No. 47. Report upon the state of the Library. Presented to the Legislature, 5th April, 1905. *Not printed*

No. 48. Report of the Temiskaming and Northern Ontario Railway Commission, for the year 1904. Presented to the Legislature, 10th May, 1905. *Printed.*

CONTENTS OF PART XI.

No. 49. Report of the Archivist, Ontario, for the year 1904. Presented to the Legislature, 17th May, 1905. *Printed.*

CONTENTS OF PART XII.

No. 50. Copies of correspondence *in re* the extension of the Boundaries of the Province. Presented to the Legislature, 27th March, 1905. *Not Printed.*

No. 51. Copies of Orders-in-Council in accordance with the provisions of section 187 of the Judicature Act, relating to commutation of fees of Public Officers. Presented to the Legislature, 31st March, 1905. *Not printed.*

No 52. Return to an Order of the House of the twenty-second day of April, 1904, for a Return giving names of all persons convicted for

violation of the Liquor License Act in the District of North Hastings in the years 1902 and 1903, together with the amounts of fines and costs in each case and the dates when the same were paid. Presented to the Legislature, 31st March, 1905. *Mr. Pearce. Not printed.*

No. 53. Return to an Order of the House of the thirty-first day of March, 1905, for a Return of copies of all correspondence between the late Government of the Province, or any member or official thereof, and the Sheriff of the County of Lincoln with regard to the appointment of George Bush as Gaoler for the County of Lincoln. Presented to the Legislature, 3rd April, 1905. *Mr. Jessop Not printed.*

No. 54. Report of the Commissioners appointed to enquire into and report the various phases of Railway Legislation in force in the United States, affecting taxation of Railways. Presented to the Legislature, 7th April, 1905. *Printed.*

No. 55. Return to an Order of the House of the sixth day of April, 1905, for a Return of copies of all correspondence between the late Government, or any member or official thereof, and G. P. Wilson and Col. Cohoe, respecting the appointment of Col. Cohoe to the position of High Court Registrar. Presented to the Legislature, 7th April, 1905. *Mr. Fraser. Not printed.*

No. 56. Revised and amended Regulations for Mining Divisions relating to the Michipicoten and Temiskaming Mining Divisions. Presented to the Legislature, 20th April, 1905. *Printed for distribution only.*

No. 57. Copies of Orders-in-Council relating to the Education Department. Presented to the Legislature, 20th April, 1905. *Printed for distribution only.*

No. 58. Return to an Order of the House of the twelfth day of April, 1005, for a Return of copies of all correspondence, papers, documents, profiles and maps, between the Government or any Department thereof and the James Bay Railway Company, or any other person or persons, relating to the route of the James Bay Railway, from January 1st, 1904, down to April 1st, 1905, both days inclusive. Presented to the Legislature, 9th May, 1905. *Mr. Hoyle. Not printed.*

No. 59. Statement of distribution of Revised and Sessional Statutes, 1898 to 1904. Presented to the Legislature, 3rd May, 1905. *Not printed*

No. 60 Return to an Order of the House of the 3rd day of May, 1905, for a Return of the copies of all correspondence, petitions or other papers in connection with the appointment of License Commissioners for the East Riding of Lambton. Presented to the Legislature, 9th May, 1905. *Mr. Auld. Not printed.*

No. 61. Return to an Address to His Honour, the Lieutenant-Governor of the fifth day of May, 1905, praying that he will cause to be laid before

this House, a Return of copies of the Statement of the Case of the Dominion, and the answer of Ontario to the Statement of Case of the Dominion, filed on Indian Claims arising out of the Northwest Angle Treaty, No. 3. Presented to the Legislature, 9th May, 1905. *Mr. Smellie. Printed.*

No. 62. Return to an Order of the House of the fifteenth day of May, 1905, for a Return of copies of all correspondence, papers, documents and memoranda relating to the drainage of the River aux Raisin, in the Townships of Osnabruck, Cornwall and Roxborough, in the County of Stormont, between the Commissioner of Public Works or his Deputy, in the years 1901, 1902, 1903 and 1904, and a Mr. Bell, C.E., Mr. Laird, C.E., Mr. Rankin Provincial Drainage Referee, and the Councils of the Townships of Roxdorough, Cornwall and Osnabruck; also, copies of all correspondence between the Hon. G. W. Ross and any of the above parties; also copies of any letters regarding this matter received by the Government from Mr. J. W. McCart and Messrs. McLennan, Cline and McLennan; also, copies of letters, authorizing the payment of Mr. Bell, C.E., Mr. Laird, C F., and several men working with them; also, a Return of the amount paid to each of the above during the years 1901, 1903, 1904. Presented to the Legislature, 23rd May, 1905. *Mr. Kerr. Not printed.*

Twenty-sixth Annual Report

of the

Ontario Agricultural and Experimental Union

1904

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

PRINTED BY L. K. CAMERON,
Printer to the King's Most Excellent Majesty
TORONTO, 1905

WARWICK BRO'S & RUTTER, LIMITED, PRINTERS,
TORONTO.

To the Honourable WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Agricultural and Experimental Union for 1904.

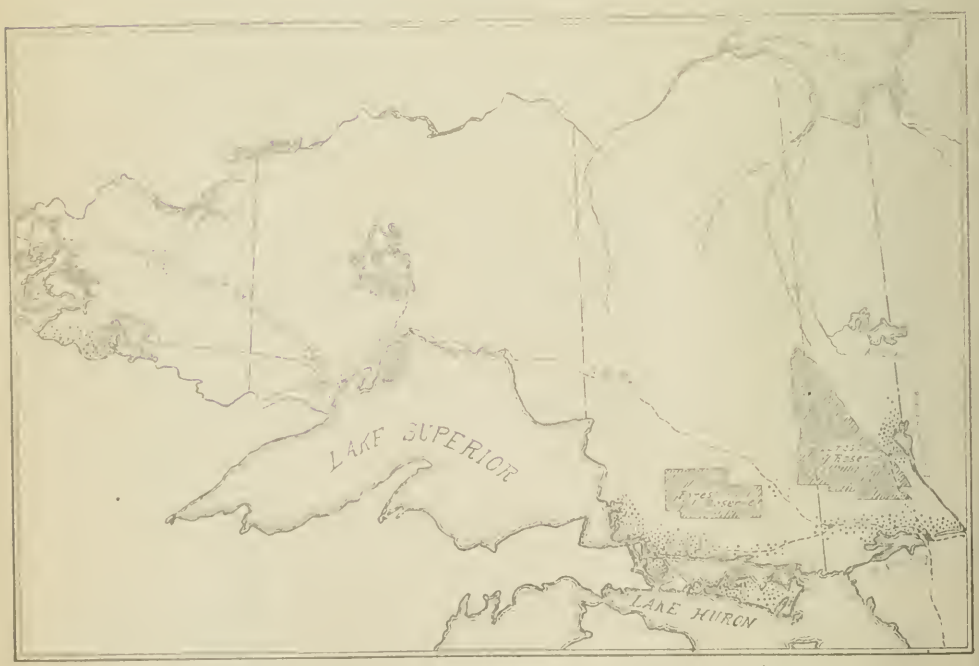
Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

Toronto, 1905.

CONTENTS.

	Page.
Officers for 1904-5	7
Treasurer's Report: H. L. Hutt	7
Union Members	8
Secretary's Report: C. A. Zavitz	11
President's Address: E. C. Drury, B.S.A.	12
Co-operative Experiments in Agriculture: C. A. Zavitz	13
Co-operative Experiments with Small Fruits: H. L. Hutt	31
Co-operative Experiments in Poultry Work: W. R. Graham	39
How to Farm Successfully with as Little Help as Possible	40
Actual Observations of Economic Methods of Increasing the Yields per Acre of our Farm Crops	46
The Principal Feeds and Fodders available to Ontario Farmers: G. E. Day	58
Analyses of By-products	60
Selection of Seed Corn: J. E. Wing, Mechanicsburg, Ohio	60
Seed Control Bill: G. H. Clark	63
The Shipping of Fruit in Cold Storage: Prof. J. B. Reynolds	63
Defects in the Woodlot and how they may be remedied: Dr. J. F. Clark	62
Report on Resolution on Farm Forestry for Ontario	69
The Story of "Woodland Farm": J. E. Wing, Mechanicsburg, Ohio	70
Address: Hon. John Dryden	75
The Ontario Agricultural College: G. C. Creelman	77
Presentation to Dr. James Mills from the ex-officers and ex-students of the Ontario Agricultural College	79
Unveiling of the Portrait of the late Prof. J. Hoyes Panton: Walter J. Brown and C. C. James	81
Unveiling of the Portrait of Dr. James Mills: Dr. Jas. W. Robertson and H. L. Fulmer	84
Class Re-unions for ex-students	85
The O. A. C. Review as the Official Organ of the Union: G. E. Day	86



MAP SHOWING CO-OPERATIVE EXPERIMENTS IN NEW ONTARIO.
Each Dot Indicates a Co-operative Experiment in Field Agriculture in 1904.

Ontario Agricultural and Experimental Union.

OFFICERS FOR 1904-1905

President ...

Vice-Presidents ...

Secretary and Editor ...

Treasurer ...

Directors ...

Auditors ...

Field Husbandry ...

Horticulture ...

Dairying, Stock and Cheesemaking ...

Poultry ...

Forestry ...

Chemistry ...

TREASURER'S REPORT, 1904

Receipts		Expenditure	
Balance from 1903	$ 190 77	Agricultural Experiments	$1 293 [illegible]
Membership fees	171 50	Horticultural Experiments	341 4
Government Grant	1,500 00	Poultry Experiments	32 91
		1903	198 56
		Part expenses annual meeting 1904	197 80
		Meeting of Executive	15 75
		Total	$1 839 29
		Balance on hand	22 88
Total	$1,862 27		$1,862 27

We, the undersigned Auditors, declare that we have examined the Treasurer's accounts, and found them correct.

M. CUMMING,
W. P. GAMBLE,
Auditors.

MEMBERS FOR 1904-1905.

The following list of members includes all of those who are or have been connected with the Agricultural College, and have paid the annual membership fee for the present year. It is quite distinct from the list of co-operative experimenters, of whom there are now 4,650.

Name.	Address.
Albright, W. D	London, Ont.
Arkell, R.	Arkell, Ont.
Austin, H. S.	Lynn Valley, Ont.
Bain, C. E.	Taunton, Ont.
Baker, Jno.	Solina, Ont.
Baker, M. R.	O. A. C., Guelph.
Ballantine, P. M.	Tavistock, Ont.
Ballantyne, N M	Stratford, Ont.
Ballantyne, Russell	Sebringville, Ont.
Ballantyne, W. W.	Stratford, Ont.
Barber, T. C.	O. A. C., Guelph.
Barberree, G. L	Corwhin, Ont.
Barlow, B.	O. A. C., Guelph
Barnet, W. A.	Living Spring, Ont.
Bartis, F.	O. A. C., Guelph.
Bartlett, T. A.	Hamilton, Ont.
Bell, G. R.	Glanford Stat., Ont
Bell, H. G.	O. A. C., Guelph.
Bengough, W. L.	Toronto, Ont.
Bergin, F. G.	O. A. C., Guelph.
Bingeman, G. W	Bloomingdale, Ont
Binnie, T. H.	Bunessan, Ont
Bissonnette, A.	Lancaster, Ont
Black, Hugh	Esquesing, Ont.
Bourns, R. W.	Havelock, N. B.
Bowers, J. C.	Berlin, Ont.
Bowes, L. A.	Strathnairn, Ont
Bracken, Jno.	Seely's Bay, Ont
Bray, D. A.	Huntsville, Ont.
Breckon, W. D.	Waterdown, Ont.
Brerton, F. E.	Bethany, Ont.
Broderick, A. D.	St. Catharines, Ont
Broderick, F. W.	Dept. Agr. Ottawa
Brodie, G. A.	Bethesda, Ont.
Brooks, J. L.	Fairport, N. Y.
Brown, Wm. A.	Meaford, Ont.
Brown, W. J.	Toronto, Ont.
Brownlee, M. C.	McDonald's Corners, Ont.
Brush, Geo.	Villard, Minn.
Buchanan, D.	Florence, Ont.
Buchanan, J.	O. A. C. Guelph.
Bunting, T. G.	St. Catharines, Ont
Burns, J. H.	St. Marys, Ont.
Bustamante, D.	Jujuy, Argentine
Butler, Gerald C.	Witham, Eng.
Byers, W. E.	Stepney, Ont.
Cameron, D.	Summerstown Sta., Ont.
Cameron, R. R.	Ailsa Craig, Ont.
Campbell, Jno. A	Simcoe, Ont.
Carpenter, G. H.	Fruitland, Ont.
Carpenter, J. F.	Fruitland, Ont.
Cass, L. H.	Caron, Sask.
Chisholm, T. B.	Hamilton, Ont.
Chisholm, V. J.	Lochiel, Ont.
Clancey, R. H.	Souris, Man.
Clark, C. P.	Alliston, Man.
Clark, Geo. H.	Dept. Agr., Ottawa.
Clark, J. A.	Bay View, P. E. I.
Clark, J. F.	Dept. Agr., Toronto.
Clarke, E. E.	Meaford, Ont.
Clowes, F. A.	Toronto, Ont.
Clunn, H. E.	Manorbier, Wales
Coben, H.	Kinmount, Ont.
Cohoe, W. J.	New Durham, Ont.
Colwill, H. H.	Oakville, Ont.
Cook, Jno. H.	Milberta, Ont.
Cornell, A. C.	Toronto.
Cote, J.	Dept. Agr., Ottawa
Craig, H.	North Gower, Ont.
Craig, Roland D.	Dept. Int., Ottawa
Crawford, E. A.	O. A. C., Guelph.
Creelman, G. C.	O. A. C., Guelph.
Culham, H. A.	Hamilton.
Cumming, Melville.	Agr. Col., Truro, N.S.
Curran, G. B.	Orillia, Ont.
Cutting, M. C.	Pugash, N. S.
Davidson, Geo. N.	Ashburn, Ont.
Davidson, J. H.	Ft. Steele, B. C.
Day, Prof. G. E.	O. A. C., Guelph.
Day, W. H.	O. A. C., Guelph.
Deachman, R. J.	Gorrie, Ont.
Dean, Prof. H. H.	O. A. C., Guelph
De Long, H. M.	Brooklin, Ont.
Dennis, F. H.	Ealing, Ont.
Dennis, J. R.	Weston, Ont.
Devitt, I. I.	Freeman, Ont.
Dewar, W. R.	Bloemfontein, S. A
Dias, P.	O. A. C., Guelph.
Dickson, J. R.	Seaforth, Ont.
Dobbie, G. S.	Guelph, Ont.
Doherty, C. P.	Castlemore, Ont.
Douglas, D.	O A. C., Guelph
Drury, E. C.	Crown Hill, Ont.
Dryden, W. A.	Brooklin, Ont.
Duncan, R. S.	Huntsville, Ont.
Dunkin, A. L.	Norwich, Ont.
Dutnie, Jas.	Hartney, Man.
Dyer, Wm. D.	Columbus, Ont.
Eddy, E. D.	Scotland, Ont.
Edelsten, Ed'n J.M	Norbiton, Eng.
Elford, F. C.	Dept. Agr., Ottawa
Elliott, G. W.	Cathcart, Ont.
Emmett, A. J.	Southend, Ont.
Esmond, C. W.	Blessington, Ont.
Evens, J.	Randolph, Ont.
Evens, Nelson	Randolph, Ont.
Everest, R. E.	Scarboro' June, Ont
Fairbairn, J. B.	Toronto, Ont.
Fairweather, A. W	Toronto, Ont.
Fairweather, F. H	Alma, Ont.
Farlinger, W. K.	Morrisburg, Ont.
Fawcett, C. Fred.	Upper Sackville, N. B.
Ferguson, Jas.	Dalmeny, Ont.

Name.	Address.
Foster, N.	Toronto, Ont.
Frier, G. M.	Shediac, N. B.
Gamble, W. P.	O. A. C., Guelph
Gandier, Millard	Lion's Head, Ont
Gilmour, J. D.	Doe Lake, Ont.
Glidden, E. K.	Compton, Que.
Goble, Fred.	Woodstock, Ont.
Good, W. C.	Brantford, Ont.
Goodchild, A.	Craigleith, Ont.
Graham, W. L.	Mosgrove, Ont.
Graham, W. R.	O. A. C., Guelph.
Greenshields, J. M.	Montreal, Que.
Gregory, C. G.	Pt. Dalhousie, Ont
Gunn, E.	Beaverton, Ont.
Hall, T. L.	Weissenburg, Ont.
Hamer, R. S.	Toronto, Ont.
Hamilton, W. D.	Dundela, Ont.
Hand, J. Albert	Stanton, Ont.
Hankinson, L. D.	Grovesend, Ont
Harcourt, Prof. R.	O. A. C., Guelph.
Hare, J. H.	Cobourg, Ont.
Harkness, A. D.	Irena, Ont.
Harkness, J. C.	Annan, Ont.
Harkness, R. L.	Irena, Ont.
Harris, Chas. H.	Rockwood, Ont.
Harrison, Prof. F.C.	O. A. C., Guelph.
Hart, F. C.	Wallace Bay, N. S
Hartman, W. J.	Woodbridge, Ont.
Hayes, J. A.	Sheffington, Que.
Hebert, G.	St. Constant, Que.
Hebert, P. A.	St. Remi, Que.
Henderson, Robt. H	Rockton, Ont.
Henderson, T. B.	Rockton, Ont.
Hinman, W. P.	Grafton, Ont.
Hodges, E.	Kinmount, Ont.
Hodgetts, P. W.	Dept. Agr., Toronto
Hodson, R.	Ottawa, Ont.
Holtermann, R. F.	Brantford, Ont.
Hoodless, J. B.	Hamilton, Ont.
Horton, D. H.	North Pelham, Ont
Hosmer, S. A.	Batavia, N. Y.
Hotson, J. W.	O. A. C., Guelph.
Houser, H. W.	Campden, Ont.
How, L. M.	Annapolis, N. S.
Howes, A. W.	Harriston, Ont.
Howitt, J. E.	Guelph, Ont.
Hubbard, W. W.	St. John, N. B.
Hudson, H. F.	O. A. C., Guelph.
Hughes, H. F.	Petitcodiac, N. B
Hunt, G. A. D.	Stratford, Ont.
Hunt, Wm.	O. A. C., Guelph
Hutcheson, J. R.	St. George, Ont.
Hutt, Prof. H. L.	O. A. C., Guelph.
Jackson, V. W.	O. A. C., Guelph.
Jacobs, F. S.	Winnipeg, Man.
Jacobs, W. S.	Barrie, Ont.
Jamieson, Geo.	Hespeler, Ont.
Jarvis, Chester	Ithaca, N. Y.
Jarvis, T. D.	O. A. C., Guelph.
Jenkins, R. N.	Todmorden, Ont.
Jewson, J. E.	Stone Quarry, Ont.
Johnson, D. M.	Knox College, Toronto, Ont.
Johnston, J. P.	Fingal, Ont.
Jones, D. H.	Bedford Park, Ont
Jordan, H. A.	O. A. C., Guelph
Jull, M. A.	Burford, Ont.
Kennedy, J. W.	Apple Hill, Ont.
Kerr, W. A.	Ashburn, Ont.
Ketchen, J. B.	Coleman, Ont.
Kitchen, A. F	St. George, Ont.
Klinck, C. R.	Victoria Sq., Ont.
Klinck, L. S.	Ames, Iowa.
Knight, A. A.	Brackenrig, Ont.
Knight, G. E.	Sardis, B. C.
Laird, J. O.	Blenheim, Ont.
Landon, M.	Simcoe, Ont.
Langley, Jno.	O. A. C., Guelph
LaPierre, L. A.	Paris, Ont.
Lawson, E. V.	O. A. C., Guelph
Leach, J. D.	Duntroon, Ont.
Le Drew, H. H.	Cupids, Newfoundland.
Lehman, R. A.	Orillia, Ont.
Leitch, A.	Cornwall, Ont.
Lennox, W. J.	Newton Robinson Ont.
Lester, Albin	Forest, Ont.
Lewes, H. S.	O. A. C., Guelph.
Lochhead, Prof. Wm.	O. A. C., Guelph.
Logan, F. M.	Amherst Point, N.S.
Lund, T. H.	O. A. C., Guelph
Macaulay, J. W.	Winnipegosis, Man
Marsh, Fred.	Clarksburg, Ont.
Mason, A. W.	Norwich, Ont.
Mason, T. H.	Straffordville, Ont.
Matheson, Geo.	Shellmouth, Man.
Mayberry, H.	Ingersoll, Ont.
Meek, M. U.	Port Stanley, Ont.
Metcalfe, Harry	Grimsby, Ont.
Miller, H. H.	Brome Centre, Que
Mills, R. W.	Toronto, Ont.
Monroe, J. F.	Southend, Ont.
Monteith, Nelson (Hon.)	Toronto, Ont.
Montgomery, C. G.	New Richmond, Que.
Moodie, Chas.	St. George, Ont.
Mooney, Jno. A.	Valley River, Man.
More, Jas.	Kirkton, Ont.
Morewood, J. R.	Inglewood, N. J.
Morgan, G. E.	Kerwood, Ont.
Morris, P. J.	Lochiel, Ont.
Mortimer, R. E.	Honeywood, Ont.
Moyer, E. R.	Mildmay, Ont.
Munro, W. A.	Chesterville, Ont.
Murray, Chas.	Avening, Ont.
Murray, Jas.	Dept. Agr., Ottawa
Murray, J. K.	Avening, Ont.
Murray-Wilson, J.G	Monte Video, Uru
McBeath, R. J.	St. Francois Xavier Man.
McBride, G. W.	Egbert, Ont.
McCalla, Geo. B.	St. Catharines, Ont
McCallum, J. M.	Shakespeare, Ont.
McCarthy, D. J.	Kingston, Ont.
McCredie, A. L.	Lyons, Ont.
McDonald, Alex.	Brooksdale, Ont.
McFayden, H.	Caledon, Ont.
McFeeters, J. A.	Owen Sound Ont.
McIntosh, Jas.	Guelph, Ont.

Name.	Address.
McDonald, Jas., Sr	Guelph, Ont.
[illegible], K. G. ..	[illegible], N. S
McKenzie, D. A.	Queen Hill, Ont.
[illegible]	Queen Hill, Ont.
McKerrall, D. A. ..	Appledore, Ont.
McKittrick, W. C.	Vankleek Hill, Ont
McQuaig, D. R. ..	Aylmer, Ont.
McTaggart, A. P. ..	St. Marys, Ont.
McVicar, [illegible] D.	[illegible]
[illegible]	Toronto, Ont.
[illegible]	Ottawa, Ont.
[illegible]	Forestville, Ont.
[illegible] Chester	Mt. Forest, Ont.
[illegible]	St. George, Ont.
[illegible]	Tamworth, Ont.
[illegible] Chas.	Scotland, Ont.
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	Brantford, Ont.
[illegible]	[illegible]
[illegible]	O. A. C., Guelph
[illegible]	[illegible]
[illegible]	Port Maitland, N. S.
[illegible]	[illegible]
Rennie, G. D.	Deerhurst, Ont.
[illegible]	[illegible]
[illegible]	O. A. C., Guelph.
[illegible]	O. A. C., Guelph
Robertson, Jas.	Ottawa, Ont.
Robertson, Jas., Jr.	Ottawa, Ont.
[illegible]	[illegible]
Robertson, Geo. ..	St. Catharines, Ont
Robinson, J. D.	Washington, D. C.
Rose, D. M. ..	O. A. C., Guelph
Ross, H. E.	Saranac, Ont.
Ross, J. G.	Montreal, Que.
Ross, Malcolm N.	Belmore, Ont.
Row, Norman W.	Toronto, Ont.
Row, C. A.	Langhorne, Pa.
Rudolf, N. N. ..	Hempstead, Jamaica.
Russell, C. G. ..	Vancouver, B. C.
Russell, D. A.	Ballinafad, Ont.
Ryley, A. L. ..	Toronto, Ont.
Sager, J. L. ..	St. George, Ont
Salkeld, G. D. ..	Goderich, Ont.
Salkeld, J. W. ..	Goderich, Ont.
Sanders, G. E. ..	Brown Hill, N. S
Scott, H. W. ..	Lancaster, Ont.
Semon, P. J. ..	O. A. C., Guelph.
Shantz, Allan	Waterloo, Ont.
Sheahan, T. A. ..	Newark, Ont.
Shepherd, H. W. R	Montreal, Que.
Shoemaker, C. B.	Mohawk, Ont.
Shuh, C.	Waterloo, Ont.
Silcox, F. H. ..	Iona, Ont.
Sirett, A. W. ..	Rosseau, Ont.
Slater, A. C. ..	O. A. C., Guelph
Sloan, R. R.	Blyth, Ont.
Smith, A. B. ..	Montreal, Que.
Smith, H. B ..	Montreal, Que.
Smith, J. E. ..	Shallow Lake, Ont
Smith, R. B. ..	Columbus, Ont.

Name.	Address.
[illegible], J. B. ..	Westmount, Que.
[illegible], S. ..	O. A. C., Guelph.
[illegible], Wm. ..	O. A. C., Guelph.
[illegible], W. J.	O. A. C., Guelph
[illegible], C. ..	Bethesda, Ont.
[illegible], D. F. ..	Harriston, Ont.
[illegible], G. M. ..	Park Hill, Ont.
[illegible], W. F. ..	Stanley Gurney, P. E. I.
[illegible], H.	Toronto, Ont.
[illegible]	Winchester, Ont.
[illegible], C. L.	Mackenzie, Man.
[illegible]	[illegible], Ont.
[illegible]	Toronto, Ont.
[illegible], R. W.	O. A. C., Guelph
[illegible]	[illegible], Que.
[illegible]	O. A. C., Guelph.
[illegible]	[illegible], Ont.
[illegible], H.	[illegible], Ont.
[illegible], W. J.	Caledonia, Ont.
[illegible]	O. A. C., Guelph
[illegible], M. W.	Woodboro, N. Y.
[illegible]	St. Isadore, Que.
[illegible], B. ..	O. A. C., Guelph
[illegible], R. W.	Smithville, Ont.
[illegible], W. E. ..	Carluke, Ont.
[illegible], Chas. E.	Brampton, Ont.
[illegible], T. ..	Cobourg, Ont.
[illegible], E. ..	Westbrook, Ont.
[illegible], C. ..	Coulson, Ont.
[illegible], J. B. ..	Comebridge, Ont.
[illegible], J. ..	Ivan, Ont.
[illegible], A. ..	Seagrave, Ont.
[illegible], B. ..	Westfield, N. Y.
[illegible], D. ..	Montreal, Que.
[illegible], E. A. ..	Sardis, B. C.
[illegible], C. A. ..	Freighsburg, Que.
[illegible], R. R. ..	Thorndale, Ont.
[illegible], H. C. ..	Hubbard, Ohio.
[illegible], W. E. ..	Lorneville, Ont.
[illegible], F. F. ..	Cincinnati, Ohio.
[illegible], C. G. ..	Perth, Ont.
[illegible], A. E. ..	O. A. C., Guelph
[illegible], G. Gordon	Grand View, Ont.
[illegible], A. T. ..	Lafayette, Ind.
[illegible], T. A. F.	Sardis, B. C.
[illegible], A. H. ..	Blyth, Ont.
[illegible], J. B.	Doloraine, Man.
[illegible], A. L.	Dundalk, Ont.
[illegible], R. H.	Dundalk, Ont.
[illegible], J. H. ..	Phillipsville, Ont
[illegible], R. M. ..	London, Ont.
[illegible], W. E. ..	O'Connor, Ont.
[illegible], M. H. ..	Wicklow, Ont.
[illegible], H. A. ..	Brandon, Man.
[illegible], J.	O. A. C., Guelph
[illegible], L. W. ..	Toronto, Ont.
Yeo, Wm.	Ryckman's Corners, Ont.
Young, A.	Glanford, Ont.
Young, W. H.	Thornton, Ont.
Zavitz, E. J. ..	O. A. C., Guelph
Zavitz, Howard V	Coldstream, Ont.
Zavitz, Prof. C. A.	O. A. C., Guelph.
Zubiaur, A.	O. A. C., Guelph.

THE ONTARIO

Agricultural and Experimental Union.

ANNUAL MEETIN

The twenty-sixth annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College, Guelph, on Monday and Tuesday, December 5 and 6th, 1904.

The President of the Union, Mr. [illegible], of [illegible], Ontario, presided over the three days sessions, the Hon. John Dryden, Minister of Agriculture for Ontario, over the public meeting in the Opera House on Monday evening, and Mr. A. C. Creelman, President of the College, at the Annual Supper on Tuesday evening.

SECRETARY'S REPORT

BY PROF. C. A. ZAVITZ, AGRICULTURAL COLLEGE, GUELPH.

The report of the last Union meeting, including the addresses of the addresses, reports of co-operative experiments, and summaries of the discussions which took place, was carefully prepared for publication and forwarded to the Department of Agriculture, Toronto, soon after the Annual meeting. The report, when printed, made a volume of seventy-six pages. The Department of Agriculture ordered 30,000 of these reports to be printed for distribution. Only 2,800 of these [illegible] had been [illegible] removed to the Parliament Buildings when the great fire took place in Toronto [illegible] of April, and the remaining 27,200 reports were burned. Owing to this misfortune, the reports did not receive a very wide circulation. Copies, however, were sent to all of the members of the Experimental Union and to all of the successful co-operative experimenters of the year 1903.

Since the last annual meeting of the Ontario Agricultural and Experimental Union, the Board of Control has met three times, twice in December, 1903, and once in September, 1904.

The co-operative experimental work of the Union has been more extensive in 1904 than in any other year since the work was started in 1886. The number of experimenters engaged in the co-operative work has increased from twelve in 1886 to about 4,700 in 1904. In agriculture alone, 4,050 farmers conducted experiments on their own farms during the past year. About ninety-eight per cent. of our experimenters reside in Ontario, and the remaining two per cent. are located in four of the other Provinces and three of the Territories of the Dominion, and in several of the States of the American Union. As the Experimental Union is a Provincial institution, we have confined the work which is being carried on outside of the Provinces almost entirely to the ex-students of the college, who are members of the Union and who are particularly interested in the co-operative work. It is interesting to note that 490 of the experimenters of 1904 reside in New Ontario, which lies north and west of Lake Nipissing and Lake Huron.

Under date of November 23rd, I received a letter from Dr. E. W. Allen, Assistant Director of the Office of Experiment Stations of the United States, and editor of the "Experiment Station Record", from which I make the following quotation: "I should be very glad to have a brief account of your meeting, which we regard as one of a good deal of importance and interest in this country, for a number of the colleges have been led by the success of your enterprise to follow your example in forming these Unions." We are pleased to note that Experimental Unions have already been established in connection with the Agricultural Colleges in Wisconsin, Ohio, Illinois, Nebraska, New York, Kansas, and Iowa; and that similar organizations are likely to be established in the near future in the States of Texas and California.

The Agricultural College in Nova Scotia which is just commencing work, the Agricultural College in Manitoba which is under erection, and the proposed Agricultural College for Quebec, should each form an excellent nucleus for co-operative experimental work by the farmers of their respective Provinces.

The system of co-operative experiments in operation in Ontario is beyond its experimental stage. Besides the financial advantages which it gives to the experimenters themselves and to the country as a whole, it furnishes an education which is of inestimable value. President Eliot, of Harvard University, tells us that if we wish to become educated in the truest sense of the word "we must learn to see straight and clear; to compare and infer; to make accurate record; to remember; to express our thoughts with precision; and to hold fast to lofty ideals". Is it not true, therefore, that the prosecution of a proper system of co-operative experimental work, embodies some of the essential constituents of a true education? I firmly believe that this grand work will gradually spread over many of the countries of the world as its true value becomes better and more thoroughly understood by the people.

PRESIDENT'S ADDRESS.

By E. C. Drury, B.S.A., Crown Hill.

The Experimental Union is unique in the fact that it is the connecting link between the work of the College and the practical work of the farm. It is composed for the most part of intelligent, scientific farmers—ex-students who have learned something of the scientific principles of agriculture, and who are putting those principles into practice on their own farms. I regard the farm as the proper place for the ex-student. While we are proud of the positions which some of our graduates have won for themselves in agricultural educational work across the line, our greatest pride is in the men who are applying on their own farms the lessons they have learned at the Agricultural College. These men are solving for themselves as best they may the practical problems in agriculture, and we must continue to send them back to the farms if we are to raise agriculture to its proper place in this Province.

One of the chief aims of the Union is to assist the young man when he leaves the College and returns to the farm, where he is thrown on his own resources. The experimental plots at the College may be said to constitute the court where varieties, methods, fertilizers, etc., receive their preliminary trial, but the final test of results is on the farm. The farmer, to be successful, must not only understand the scientific principles of agriculture,

but he must know how to put those principles into practice, and, by their aid, to discover what varieties will give him the best results under the conditions in which he finds himself placed. It is at this point that the Union comes to his assistance and enables him to test for himself, under his own peculiar conditions of soil and climate, the varieties which have obtained a leading place in the trials conducted here. Thus, we bring the results before the people in a practical way.

Last year 4,700 experimenters carried on our experiments for themselves. Each one who carried through an experiment successfully secured information which he could not get in any other way, and, at the same time, received a training which is of great educational value. I know from actual experience how much it costs in time and attention to look after a series of experimental plots when help is scarce and work pressing, and the fact that the number of satisfactory reports is greater this year than last, or, in fact, than in any previous year, speaks volumes for the increased capacity and intelligence of our experimenters.

Three or four years ago the Union appointed a Forestry Committee, and last year a resolution was brought down which the late Dr. Muldrew, H. C. Ross, and myself joined in framing. It resulted in a nursery for forest trees being established at this College, the intention being to distribute to the farmers for planting, the seedlings which are raised here. This work is excellent so far as it goes, but I do not think it goes far enough. The policy of the Committee to which I have referred, had for its object the reforesting of the waste places in older Ontario. An individual who reforests cannot expect to reap from his planting, and, unfortunately, public spirit is not yet sufficiently developed to induce general planting without hope of personal reward. Consequently, while the individual farmer will do something in the planting of wind-breaks and ornamental trees, he cannot be expected to take part in a general policy of covering the waste places—a covering which is necessary to restore a proper balance between forest and cleared land, and which would make property of great value, which is now valueless. There are many such waste tracts in Ontario, which were originally covered with valuable timber, and will grow nothing else. One exists in the northerly part of the County of Simcoe, where the land is so utterly valueless that it is not even fenced. I hope a policy will yet be adopted which will lead to all such lands being re-clothed with forest.

CO-OPERATIVE EXPERIMENTS IN AGRICULTURE.

By Prof. C. A. Zavitz, Agricultural College, Guelph.

On behalf of the Committee, and as director of the co-operative experiments in agriculture throughout Ontario, I submit the summary results of the carefully conducted experiments which were carried out over the Province during 1904. Many of the farmers are now quite familiar with the system of co-operative work which is being carried on by the Experimental Union, and yet it seems necessary to make some explanations for the benefit of those who have not been directly engaged in the work themselves. I therefore take the liberty of making some explanations regarding the general system of the co-operative work as carried on by the Experimental Union, which may add to the interest of the report which follows.

The experimental work at the College was commenced in 1876, just two years after the establishment of the College itself. These experiments

have been increased from year to year, and now include work along the various lines of agriculture. In the experiments with farm crops, upwards of 2,000 plots are used annually in growing grains, fodders, grasses, clovers, roots, and potatoes, with the object of obtaining information regarding the best varieties, the most productive selections of seed, the best dates of seeding, the most improved methods of cultivation, the most economical ways of increasing the fertility of the soil, etc.

Five years after the College was started, the officers, students, and ex-students formed themselves into an association under the name of the "Ontario Agricultural and Experimental Union." The objects of the association, as formulated at that time, were as follows: "To form a bond of union among the officers and students, past and present, of the Ontario Agricultural College and Experimental Farm; to promote their intercourse with the view to mutual information; to discuss subjects bearing on the wide field of agriculture, with its allied sciences and arts; to hear papers and addresses delivered by competent parties; and to meet at least once annually at the Ontario Agricultural College." In 1886 the members of this association appointed a committee to confer with the officers of the College, with the object of establishing a system of co-operative experiments throughout the Province. Letters were written to members of the Union, and twelve consented to conduct experiments with fertilizers and field crops on their own farms in the year 1886. From that time to the present the work has gradually branched off along different lines until it has touched on several phases of agricultural work.

In the spring of each year, circulars, outlining the co-operative work, are distributed by the agricultural committee appointed by the Experimental Union. Those asked to take part in the scheme of co-operation may be classified as follows: (1) The officers and students, past and present, of the Ontario Agricultural College, who pay an annual fee of 50 cents, and have control of the Executive work of the Experimental Union; (2) the experimenters of former years who have done satisfactory work; (3) leading farmers, gardeners, and others, whose names have been suggested by secretaries of Farmers' Institutes, secretaries of Agricultural Societies, principals of Collegiate Institutes, inspectors of Public Schools, and others; and (4) various persons who have seen the experiments of other people, or have in some way heard of the work and wish to assist in the movement by conducting experiments on their own farms. The circulars are distributed in the order here given, starting first by sending to those who have been connected with the College, and are therefore trained for the work, and finishing the distribution by sending to those engaged in some branch of practical agriculture who have not conducted experiments previously but who wish to undertake the work.

From the beginning the co-operative and experimental work of the Union has been directed and controlled by circulars and letters, printed and written, which have been transmitted through the mails. When personal visits have been made to the experimenters, the object has been to enable the director to study the difficulties of those actually engaged in the work, and thus to be in a better position to know the best methods to adopt in the printed instructions, rather than to take any part in the immediate control of the practical operations of the experiments.

Every man is made responsible for his own experiment, and is urged to do the very best he can for himself, for his neighbors, and for the Union. Many persons who at first took but little interest in the experiments, have afterwards proven themselves to be most valuable experimenters, and have shown great care and accuracy in the details of their work. The names of

those who conduct the experiments with the proper amount of care and accuracy are placed on the list of successful experimenters, and these individuals are carefully looked after in the future. It will, therefore, be seen that the Experimental Union makes a study of the men themselves, as well as of the products of their labor. The education of the men in the development of accurate methods, careful observation, and a deeper interest in the occupation of farming is one of the objects of the co-operative experimental work in Ontario. I have no hesitation in saying that the results which have been obtained along this line alone are of far greater value than the entire cost of the co-operative work of the past seventeen years.

No direct financial help is offered any person to undertake and carry through the co-operative work. It is purely a volunteer movement from the start to the finish. The materials for the experiments, the instructions for making the tests, and the blank forms for reporting the results are furnished free of cost to those who ask to join in the work and who sign the agreement furnished by the Union. Experimenters in crop production use the soil on their own farms, conduct the experiments themselves, and report the results to the director of that particular branch of co-operative work in which they have enlisted. In those experiments in which crops are produced, the produce is retained by the experimenters as their personal property, except any small quantities which are returned to the college as samples.

The cost of the co-operative experiments is paid conjointly by the station and the Union. The station pays for most of the labor and for some of the material, and the Union for all of the stationery, printing, postage, expressage, etc., as well as for part of the material required to carry on the co-operative work.

The co-operative experimental work of the Union has been more extensive in 1904 than in any other year since the work was started in 1886. In agriculture alone, 4,050 farmers conducted experiments on their own farms during the past year. A fair proportion of these men have been successful with their work in each of five, six, eight, ten, and even twelve years, and have become quite expert experimenters. The work has been carried out along thirty-five distinct branches of field agriculture, thus covering practically all of the crops which are grown on the 10,000,000 acres of the cultivated land of Ontario each year.

One of the pleasing features of the work of the past season has been the introduction of the co-operative experiments into practically all of the settlements of New Ontario. We are pleased to state that no less than 490 of the farmers of New Ontario were engaged in this work within the past year. These people were located at no less than 117 different post offices. It is impossible to estimate the great value of this work in supplying seed of the best varieties of farm crops, in encouraging improved methods of agriculture, and in starting the people in the new country to experiment and to investigate for themselves along the lines of their life work.

LIST OF EXPERIMENTS FOR 1904.

The following is the list of the co-operative experiments in agriculture conducted in 1904:

	Plots.
Grain Crops:	
1. Testing three varieties of Oats	3
2. Testing three varieties of Barley	3
3. Testing two varieties of Hulless Barley	2
4. Testing two varieties of Spring Wheat	2
5. Testing two varieties of Buckwheat	2
6. Testing two varieties of Field Peas for Northern Ontario	2
7. Testing Emmer and Spelt	2
8. Testing Cow Peas and two varieties of Soy, Soja or Japanese Beans	3
9. Testing three varieties of Husking Corn	3
Root Crops:	
10. Testing three varieties of Mangels	3
11. Testing two varieties of Sugar Beets for feeding purposes	2
12. Testing three varieties of Swedish Turnips	3
13. Testing Kohl Rabi and two varieties of Fall Turnips	3
14. Testing parsnips and two varieties of Carrots	3
Forage, Fodder, Silage and Hay Crops:	
15. Testing three varieties of Fodder and Silage Corn	3
16. Testing three varieties of Millet	3
17. Testing three varieties of Sorghum	3
18. Testing Grass Peas and two varieties of Vetches	3
19. Testing two varieties of Rape	2
20. Testing three varieties of Clover	3
21. Testing Sainfoin, Lucerne and Burnet	3
22. Testing seven varieties of Grasses	7
Culinary Crops:	
23. Testing three varieties of Field Beans	3
24. Testing three varieties of Sweet Corn	3
Fertilizer Experiments:	
25. Testing fertilizers with Corn	6
26. Testing fertilizers with Swedish Turnips	6
Miscellaneous Experiments:	
27. Growing Potatoes on the level and in hills	2
28. Testing two varieties of early, medium or late Potatoes	2
29. Planting Cut Potatoes which have and which have not been coated over with land plaster	2
30. Planting Corn in rows and in squares (an excellent variety of Early Corn will be used)	2
Autumn Sown Crops:	
31. Testing Hairy Vetches and Winter Rye as fodder crops	2
32. Testing three varieties of Winter Wheat	3
33. Testing five fertilizers with Winter Wheat	5
34. Testing autumn and spring applications of nitrate of soda and common salt with Winter Wheat	5
35. Testing Winter Barley and Winter Rye for grain production	2

The most of the plots were one rod wide by two rods long, being exactly one-eightieth of an acre in size. The largest plots used in 1904 contained sixteen square rods, and were, therefore, one-tenth of an acre each. Formerly some of the plots were one-half of an acre in size, but these gave less satisfaction than the smaller ones.

The results of the co-operative tests were very carefully examined, and those which were complete, and which showed carefulness and reliability throughout, were summarised. While these summaries should be of great value to the farmers generally, still those who conducted the experiments themselves obtained much additional information regarding the results of their experiments as adapted to their individual circumstances which it is impossible to convey in a concise report of this kind.

The experimenters deserve great credit for successfully conducting the various experiments during the past season, and farmers owe much to these experimenters for the valuable reports which they furnished and which are here presented in summary form.

The following are the average results of the co-operative experiments successfully conducted over Ontario in 1904, with grain crops, field roots, and fodder crops, hay crops, potatoes, application of fertilizers, methods of cultivation, etc.:

Grain Crops.

Experiments	Varieties	Comparative value	Yield per Acre		
			Straw (tons)	Grain (lbs.)	Grain (bus.)
Oats, (120 tests)	Tartar King	100	1.38	1,728	50.82
	Siberian	81	1.51	1,685	49.56
	Liberty	80	1.30	1,637	48.15
	Early Ripe	51	1.25	1,458	42.88
Six-rowed Barley, (33 tests)	Mandscheuri	100	1.28	1,739	36.23
	Oderbrucker	80	1.24	1,699	35.40
Hulless Barley, (31 tests)	Guy Mayle	100	1.10	1,766	29.43
	Black Hulless	73	1.05	1,607	26.78
Spring Wheat, (19 tests)	Wild Goose	100	1.23	1,169	19.48
	Red Fife	62	98	586	9.77
Emmer and Spelt, (7 tests)	Common Emmer	100	1.36	2,274	56.85
	Red Spelt	50	1.01	1,263	31.58
Buckwheat, (4 tests)	Silver Hull	100	3.88	1,122	23.38
	Japanese	80	3.68	645	13.44
Field Peas, (22 tests)	New Canadian Beauty	100	1.86	1,802	30.03
	Early Britain	94	1.50	1,692	28.20
Field Beans, (10 tests)	Marrowfat	59	1.28	1,820	30.33
	White Wonder	100	1.29	1,766	29.43
	New Prize Winner	86	1.25	1,639	27.32
Winter Wheat, (3 tests)	Imperial Amber	100	1.03	1,348	22.47
	Michigan Amber	63	1.59	1,125	18.75
	Turkey Red	63	1.11	1,026	17.11
			Whole Crop		
Corn for Grain, (9 tests)	King Phillip	100	9.18	3,135	55.99
	Compton's Early	95	10.21	3,064	54.71

In the first column of figures in the table here presented, the comparative values of the different varieties are given, 100 representing the most popular variety in each class of crop. These figures are the summary of the answers given by the experimenters in regard to the relative value of each variety as the result of individual tests throughout the Province when the various characteristics of the different varieties were all taken into consideration. The yield of straw, as here reported, for the grain crops, represents the total crop less the amount of grain, and would, therefore, include the chaff or the husks with the straw or the stalks. The yield of grain is given in pounds, and also in bushels per acre. It is thought that a presentation of the results in both ways would be more clearly understood, owing to the variation in weight per measured bushel of the different classes of grains under consideration.

Oats. Four varieties of oats were distributed throughout Ontario in 1904. Satisfactory reports of carefully conducted experiments were received from one hundred and twenty experimenters in 1904. With one exception, this is the largest number of good reports on oats received in any one year. From the average results here presented, it will be seen that the Tartar King heads the list with an average of 50.8 bushels per acre. This is a comparatively new variety, originated by the Garton Bros., of England. It possesses a long straw, side head, and large, plump, white grain. The straw is exceptionally stiff, which is one of the important characteristics of this variety. The grain, however, is somewhat thick in the hull, having about 35 per cent. of hull, while that of the Liberty contains about 32 per cent. and the Siberian about 30 per cent. of hull. This is the first year that the Tartar King variety has been distributed for co-operative experiments over Ontario, and it has certainly made a very excellent record, producing the greatest yield, possessing the stiffest straw, and being the most popular variety of those distributed. The Siberian variety has been distributed for many years, and has made high records throughout Ontario below the Siberian in the average results for that year, dropped to about 1½ bushels per acre less than the Tartar King. The Liberty variety, which was distributed in 1903 for the first time, and which came only a few pounds below the Siberian in the average results for that year, dropped to about 1½ bushels per acre less than the Siberian in 1904. Of upwards of two hundred varieties of oats which have been tested at the Agricultural College, the Early Ripe has proven to be the earliest variety. It has a medium length of straw, which is comparatively free from rust. It is better suited to mix with a medium ripening variety of barley for grain production, than for growing extensively by itself.

Six-rowed Barley. The Mandscheuri six-rowed barley, which was imported from Russia by the Ontario Agricultural College, in 1889, and which has made such very high records both at the College and throughout Ontario in the experiments of former years, again takes the lead in yield per acre in 1904. The Oderbrucker variety, which was imported from Germany, and which is one of the closest rivals of the Mandscheuri which has been introduced into Ontario, gave an average of about one bushel per acre less than the Mandscheuri in the average of thirty-three tests over Ontario in the past year. Of the two varieties, the Mandscheuri possesses the stiffer straw, and is the more popular variety among the experimenters. Owing to the fact that seed of the third leading variety of barley was not in our possession in the spring of the year, we included Emmer as one of the varieties for this experiment, the average yield for the Province being 38.2 bushels per acre, and the average weight per measured bushel being about 40 pounds. The straw of the Emmer was about equal in strength, and was somewhat heavier than that of the Mandscheuri barley.

Hulless Barley. Much has been said of late in reference to the growing of Hulless barley in Ontario. Some fourteen varieties have been grown in the trial grounds at the Agricultural College, in which tests the Guy Mayle has produced the greatest yield of grain per acre. In 1904, this variety was distributed throughout Ontario for co-operative experiments for the first time. The results of thirty-one carefully conducted tests of the Guy Mayle and the Black Hulless show that the former surpassed the latter by 159 pounds of threshed grain per acre. The Guy Mayle possessed stiffer straw, which was less rusted than that of the Black Hulless. Taking the various characteristics of the two varieties into consideration, the experimenters, as a whole, decided in favor of the Guy Mayle as the most suitable variety for general cultivation throughout the Province.

Spring Wheat. The comparative test in 1904 was made between two prominent varieties of spring wheat which have been grown in Ontario for many years, viz.: The Red Fife and the Wild Goose. The former has proven to be one of the best varieties for flour production which we have secured for Ontario, and the latter for the production of macaroni, among eight varieties representing the macaroni class which we have tested at the College. The Red Fife proved a failure in many cases. In the average results of nineteen tests in which yields were recorded, we find that the Red Fife gave less than 10 bushels per acre. Although the Wild Goose gave about double this quantity, the yield of this variety is a little less than 20 bushels per acre. The Wild Goose was decidedly the more popular with the experimenters.

Emmer and Spelt. Emmer and Spelt are two distinct types of wheat, there being a number of varieties belonging to each type. The grain of both the Emmer and the Spelt is tightly enclosed within the chaff, from which only a small portion is separated in the process of threshing. The heads of Emmer are short and compact and are nearly always bearded; while those of Spelt are long, narrow, open, and are usually bald. The spikelets of the Emmer overlap each other like shingles on a roof, which thus makes the head close, smooth, and regular. The portion of the stem adhering to the spikelets after threshing is much smaller and more pointed in the Emmer than in the Spelt. The spikelets of the Emmer are flattened on the inner side; while those of the Spelt are arched. The grain of the former is very hard and the chaff much softer than that of the latter. Three varieties of Emmer and ten varieties of Spelt have been grown in the Experimental Department of the Ontario Agricultural College. The variety in each class which gave the best satisfaction was distributed throughout Ontario in the spring of 1904 for co-operative testing. The results of seven carefully conducted experiments show that the Common Emmer produced nearly 57 bushels, while the Spelt produced only about 32 bushels per acre. The yield of straw of the Emmer was about one-third greater than that of the Spelt. Of the two grains, the Emmer was decidedly the more popular among the experimenters. It is quite probable that the Emmer will be grown considerably throughout Ontario for the production of good, clean, straw, and a large yield of grain to be used as a food for live stock. For feeding purposes, the grain and the surrounding chaff are usually ground together in the same manner as oats are ground into meal. The average percentage of hull of Emmer is only about three-quarters as great as the average percentage of hull of oats.

Buckwheat. The results of only four satisfactorily conducted experiments with buckwheat were received this year. The average of these reports shows that the Silver Hull variety gave about 10 bushels per acre more

than the Japanese buckwheat. During the last two years, which have been comparatively cool and wet throughout Ontario, the Silver Hull variety has given much better results in comparison with the Japanese variety than it gave in the drier seasons. In 1903, the Silver Hull variety gave an average of 32 bushels, and the Japanese 20 bushels per acre.

Field Peas. Two varieties of peas, the Early Britain and Canadian Beauty, were distributed in those districts of Ontario which are as yet uninfested with the pea weevil. The average results of twenty-two tests show that the Canadian Beauty gave 30 bushels, and the Early Britain 28.2 bushels per acre. This is the first time that the Early Britain variety has been surpassed in yield per acre in the co-operative experiments throughout Ontario. The Canadian Beauty was the most popular of the two varieties among the experimenters this year.

Field Beans. The yields per acre of the beans used in the co-operative experiments were quite satisfactory in the past year, the largest being upwards of 30 bushels per acre. The Marrowfat came at the head of the list, producing about one bushel per acre more than the White Wonder, and about three bushels per acre more than the New Prize Winner variety. Although the Marrowfat gave the largest yield, the White Wonder was selected by the experimenters as being the best variety for them to grow. Perhaps one of the reasons why the Marrowfat is not as popular as some of the other varieties is the fact that a good many of the beans become split before they are ripe and ready for market. The New Prize Winner is a comparatively new bean, quite early in maturing, and one that has made a very good record at the College in the last two years.

Winter Wheat. The summary reports of the results of winter wheat experiments conducted both at the College and throughout Ontario during the past year were prepared and sent to all of the newspapers of Ontario, about three weeks before seeding time in the autumn. In the co-operative experiments, the Imperial Amber gave the largest yield per acre, viz., 22.5 bushels. This was followed by the Michigan Amber, with nearly 19 bushels, and the Turkey Red, with a little over 17 bushels per acre. All three varieties are bearded. The grain of each variety is red, hard, and is considered by the millers to be of good quality for flour production. All three varieties possess straw which is somewhat weak. The Dawson's Golden Chaff, which has made high records at the College and in the co-operative experiments throughout Ontario in former years, was not distributed in the autumn of 1902, as it is already pretty generally grown throughout the Province.

Corn for Grain. The past season has been an exceptionally unfavorable one for the growth of corn for grain production throughout Ontario. Three varieties were distributed for co-operative experiments, but, owing to the backwardness of the spring, the cold, wet summer, and the early autumn frosts, the North Star Yellow Dent did not mature sufficiently to furnish satisfactory reports regarding its yield of grain per acre. The summary report, therefore, is confined to the King Phillip and the Compton's Early, which are among the earliest varieties of corn for Ontario. The average results of nine successfully conducted experiments show that the King Phillip produced about 56 bushels per acre, and the Compton's Early about 1 1-5 bushels per acre less. Although the King Phillip produced slightly the greatest yield of grain, the Compton's Early gave fully one ton of total crop per acre more than the King Phillip variety. Taking everything into consideration, however, the King Phillip was slightly more popular among the experimenters than the Compton's Early.

Field Roots and Fodder Crops.

Experiments	Varieties	Comparative value	Yield per Acre (tons)
Mangels, (5 tests)	Yellow Leviathan	100	29.31
	Sutton's Mammoth Long Red	86	26.27
	Steele-Briggs' Giant Yellow Globe	64	25.93
Sugar Beets, (9 tests)	New Danish Improved	100	31.29
	Royal Giant	89	29.51
Swede Turnips, (4 tests)	Magnum Bonum	100	22.17
	Kangaroo	70	20.08
	Hartley's Bronze Top	70	19.33
Fall Turnips and Kohl Rabi, (1 test)	Red Top White Globe Turnip	100	33.48
	Cow Horn Turnip	80	26.96
	Early White Vienna Kohl Rabi	60	20.52
Carrots and Parsnips, (2 tests)	Mammoth Inter. Smooth White Carrot	100	16.16
	Improved Short White Carrot	83	15.20
	Buckbee's New Sugar Parsnip	67	11.72
Fodder Corn, (2 tests)	Henderson's Eureka	100	21.22
	White Cap Yellow Dent	85	17.50
	Rennie's Improved Leaming	75	16.46
Sorghum, (1 test)	Early Amber Sugar Cane	100	18.00
	Early Orange Sugar Cane	88	16.20
	Kaffir Corn	38	13.36
Grass, Peas and Vetches, (4 tests)	Grass Peas	100	5.90
	Hairy Vetches	70	5.03
	Common Vetches	80	3.78
Rape, (1 test)	Dwarf Essex	100	25.72
	Dwarf Bonanza	95	25.32

Mangels. Three varieties of mangels, viz,: Yellow Leviathan, Sutton's Mammoth Long Red, and Steele-Briggs' Giant Yellow Globe, were distributed for co-operative experiments in 1904. These represent three distinct classes, viz.: the long, the intermediate, and the globe. In the summary of the five good reports received from the experimenters, it was found that the Yellow Leviathan headed the list with an average of 29.3 tons per acre, which is about 3 tons per acre more than that for the Sutton's Mammoth Long Red, and about 3½ tons per acre more than that for the Steele-Briggs' Giant Yellow Globe. The Yellow Leviathan has given the largest yield of mangels per acre among all the varieties grown at the Agricultural College for some years past. Seed of this variety can be obtained from D. M. Ferry & Co., Windsor, Ont.

Sugar Beets for Feeding Purposes. Some thirty-two varieties of sugar beets have been carefully tested at the Agricultural College, both for crop production and for sugar content. Some of these varieties produce moderate yields per acre and give beets containing 15 or 16 per cent. of sugar; other varieties give much larger yields per acre, but, according to analyses, the percentage of sugar is only about two-thirds as great as in those beets which have been specially bred for sugar production. Two of the large

yielding varieties were selected for the co-operative experiments in 1904. In the average of nine experiments, the New Danish Improved gave 31.3 tons, and the Royal Giant 29.5 tons of roots per acre. This is the first time that the Royal Giant variety has been used in the co-operative experiments.

Swede Turnips. The Sutton's Magnum Bonum, which is an English variety, has given very satisfactory results in the co-operative experiments throughout Ontario, occupying first place in yield of roots per acre in four out of the past five years. In 1904, not only did it give a larger yield per acre, but it was the most popular variety in the estimation of the experimenters. The Hartley's Bronze Top, a good old variety, was surpassed this year by the Sutton's Magnum Bonum variety by nearly 3 tons, and by the Kangaroo by about two-thirds of a ton per acre.

Fall Turnips and Kohl Rabi. As in the experiments at the Agricultural College at Guelph, the Red Top White Globe turnip occupied first place in yield of roots per acre. The Early White Vienna Kohl Rabi produced about two-thirds as great a yield as the turnip here referred to.

Field Carrots and Parsnips. In 1902 the Bruce's Mammoth Intermediate Smooth White carrot headed the list in yield of roots per acre. Seed of this variety was secured in the spring of 1903, but, owing to poor germination, it was not distributed. Fresh seed was obtained in the spring of the present year, and was distributed along with that of the Improved Short White carrot and of the Buckbee's Sugar parsnip. It is interesting to note that the Intermediate Smooth White variety again heads the list by about one ton per acre over the Improved Short White carrot, and about 4½ tons per acre over the parsnip.

Fodder Corn. The White Cap Yellow Dent variety of fodder corn was again distributed in 1904. Along with this corn, two new varieties were sent out for the first time, viz.: the Henderson's Eureka and the Rennie's Improved Leaming. As in the results at the College, the Henderson's Eureka gave the largest yield per acre, the yield being 21.2 tons. This was followed by the White Cap Yellow Dent with 17½ tons, and the Rennie's Improved Leaming with about 16½ tons per acre. Although the Henderson's Eureka is the latest variety of the three to mature, it was very favorably spoken of by the experimenters as being a suitable corn for fodder or for the silo. It is probable, however, that the White Cap Yellow Dent and the Rennie's Improved Leaming will prove more serviceable in most years throughout the central part of the Province.

Sorghum. Only the one report on sorghum has been received this year. This indicates, as formerly, that the Early Amber Sugar Cane produced the greatest yield per acre. The Kaffir Corn occupied the lowest place on the list, producing nearly 5 tons per acre less than the Early Amber Sugar Cane.

Grass Peas and Vetches. The yields of green fodder produced by the Grass Peas and the Vetches are all very low this season. In the average of four co-operative experiments, the Grass Peas headed the list with nearly 6 tons per acre, while the Hairy Vetches followed with about 5 tons, and the Common Vetches with less than 4 tons per acre. Experimenters report that they fed these crops to horses, cows, and pigs. While all the crops appeared to be relished by the animals, the Common Vetches seemed to be eaten a little more readily than the others.

Rape. The Dwarf Bonanza variety of rape has been distributed for co-operative experiments for two years in succession. The results for 1903 show that for that year it gave rather better results than the Dwarf Essex

variety, but in 1904 the Dwarf Essex surpassed the Dwarf Bonanza by two-fifths of a ton of green crop per acre. Either of these varieties give good satisfaction.

HAY CROPS.

Experiments	Varieties	Average height last year, 1904. Inches.	Tons of dry hay per acre.
		3 tests	3 tests
Millet	Japanese Barnyard	21.00	2.38
	Hungarian	21.00	2.00
	Japanese Panicle	23.00	1.36
			Second year's crop
		4 tests	10 tests
Clover	Mammoth Red	5.50	3.84
	Alsike	4.75	2.54
	Common Red	5.50	2.11
		7 tests	2 tests
Perennial Crops	Lucerne	7.71	3.00
	Sainfoin	5.43	1.31
	Burnet	4.66	1.30
		1 test	9 tests
Grasses	Tall Oat	17.00	2.64
	Timothy	12.00	2.50
	Orchard	8.00	1.87
	Awnless Brome	6.00	
	Tall Fescue	10.00	
	Western Rye	10.00	
	Lyme Grass	8.00	

Millet. For nine years in succession, the comparative test of a large number of varieties of millets has been carried on in connection with the experimental work at Guelph. These varieties included the Japanese Panicle, which gave an average of 4.5 tons; the Japanese Barnyard, an average of 4 tons; and the Hungarian, an average of 3.6 tons of hay per acre. In the co-operative experiments over Ontario with these varieties in 1904, the yields are much less and the results somewhat different. We find that the Japanese Barnyard variety gave the largest yield, producing nearly 2½ tons; while the Japanese Panicle came at the bottom on the list with less than 1½ tons per acre. The past season was a very unfavorable one for the production of millet.

Clover. The Mammoth Red, Alsike, and Common varieties of clover are distributed for co-operative experiments each year. Experimenters are advised to so locate their plots that they may be left for the following year. So far we have obtained good reports from ten experimenters, who have been able to get the comparative yields of hay from the clovers during the second year after seeding. The results include simply the first cutting of each crop in the season. The average of the ten reports shows the Mammoth Red to come at the top of the list with 3.8 tons, and the Common Red at the bottom of the list with 2.1 tons of cured hay per acre.

Perennial Crops. Only two reports have been received giving the yield of the first cutting of the second years' growth of Lucerne, Sainfoin, and Burnet. The summary results show that Lucerne produced more hay per acre than the Sainfoin and Burnet combined. We hope in a few years to have a more valuable report on this important experiment.

Grasses. In the average of nine tests, in which the first cutting in the second year after the seed was sown is given, we find that the Tall Oat stands at the head of the list with 2.6 tons; the Timothy second with 2.5 tons; and the Orchard third with 1.9 tons of cured hay per acre. We are at present sending out seven different grasses for co-operative experiments. Six of these grasses have made the following average comparative yields of dried hay per acre in seven years' experiments at the College: Western Rye Grass, 4.4 tons; Lyme Grass, 4.3 tons; Timothy, 3.5 tons; Tall Oat Grass, 2.8 tons; Orchard Grass, 2.6 tons; and Awnless Brome, 2.2 tons per acre. The Tall Fescue Grass was not included in the experiments at the College for the seven years, and therefore, the results cannot be here presented. We hope to obtain some valuable reports from farmers who are testing these varieties of grasses upon their own farms.

Autumn Sowing of Hairy Vetches, Winter Rye, and Crimson Clover as Fodder Crops. An interesting experiment has been carried on in each of the past two years by sowing Hairy Vetches, Winter Rye, and Crimson Clover in the autumn for the purposes of producing green fodder in the following summer. The reports show that the Crimson Clover was badly winter killed in each of the past two years. In the average results of the experiments of the past season, the Hairy Vetches gave a yield of 6.8 tons, and the Winter Rye of 4.3 tons of green crop each year. When fed to farm stock, the Hairy Vetches appeared to be relished much better than the Winter Rye.

POTATO EXPERIMENTS.

Experiments.	Potatoes.	Comparative value.	Percent. rotten.	Percent. of small tubers.	Mealiness when cooked.	Yield of whole crop per acre.
						bus.
Late Varieties (62 tests)	Empire State	100	11	7	100	224.5
	American Wonder	93	11	7	89	221.8
Medium Varieties (55 tests)	Rose of the North	100	1	10	97	200.4
	Burpee's Extra Early	69	1	13	100	162.0
Early Varieties (163 tests)	Early Andes	92	3	9	90	170.8
	Early Fortune	100	6	8	88	162.9
	Early Dawn	75	8	15	100	136.2
	Early Pinkeye	72	.....	16	89	128.0
	Early Ohio	75	5	13	94	125.0
	Stray Beauty	56	7	18	69	102.2
					Average yield in four years. bus.	
Methods of Cultivation (37 tests)	Grown in hills	100	.....	7	216.7	249.2
	Grown on the level	73	.....	8	212.5	225.4
					Average yield in five years. bus.	
Preparation of Seed (17 tests)	Potatoes coated with land plaster	100	.....	8	187.7	228.2
	Potatoes not coated with land plaster	71	.....	10	177.6	213.2

Varieties of Potatoes. No less than ten varieties of potatoes were distributed for the co-operative experiments throughout Ontario in 1904. These included two late, two medium, and six early varieties. Only two kinds were sent to each experimenter, but, as the Early Ohio was distributed to all the experimenters who received early potatoes, a basis was formed by which the yields per acre of the other varieties could be placed in one comparative table, which is here presented. In the average of four years experiments at the College, we find that the number of days from the time of planting until the potatoes of each of the varieties here referred to were ripe was as follows: Empire State, 114; American Wonder, 112; Rose of the North, 107; Burpee's Extra Early, 107; Early Andes, 96; Early Fortune, 96; Early Dominion, 96; Early Ohio, 94; Stray Beauty, 93; and Early Pinkeye, 91. The average results of sixty-two tests for the two late varieties show that these two potatoes are very similar in nearly all characteristics, with a slight advantage in favor of the Empire State in yield per acre, in quality of the cooked potatoes, and in general popularity. With the medium varieties of potatoes, however, the results are somewhat different, as the Rose of the North gave a decidedly larger average yield than the Burpee's Extra Early and was also more popular among the experimenters than the last named variety. Of the six early varieties, the Early Andes produced upwards of 170 bushels, and the Stray Beauty only 102 bushels per acre. The Early Andes had the least, and the Early Dominion the greatest amount of rot. Upwards of 90 per cent. of the potatoes of the Early Andes and the Early Fortune varieties were more than one and one-half inches in diameter. Taking everything into consideration, the most popular varieties were the Empire State among the late, the Rose of the North among the medium, and the Early Fortune among the early kinds.

Methods of Cultivating Potatoes. For four years in succession, potatoes have been distributed throughout Ontario and instructions given for carrying on a careful experiment in comparing the practice of "hilling up" potatoes as against growing them on the level. The results for 1903 and those for 1904 are in favor of "hilling up" potatoes, probably due to the cool, damp seasons of the past two years. In each of the two years previous, the results were in favor of level cultivation. Taking the average of the four years, during which time one hundred and thirty-seven successfully conducted experiments have been reported, we find that the potatoes which were hilled up gave 216.7 bushels, and those which were grown on the level gave 212.5 bushels per acre, or about four bushels per acre in favor of those grown in hills. The average results previous to this year were in favor of the level cultivation, but it will be seen by the table here presented that in 1904 the land which was hilled up gave about 24 bushels per acre more than that which was cultivated on the level.

Preparation of Seed Potatoes. In experiments conducted at the College in cutting potatoes and planting the pieces after they had been sprinkled with lime, plaster, etc., in comparison with planting the pieces without being sprinkled with any material, it was found that those potatoes which were sprinkled with land plaster gave better results than the potatoes prepared in any other way. For five years, an experiment has been conducted throughout Ontario in order to let farmers ascertain for themselves whether there would be any marked advantage from using land plaster on their seed potatoes before planting. In 1900, 1901, 1902, and 1903, the land plaster showed a marked advantage. In the average of

the five years, in which there were in all ninety-seven successfully conducted experiments, we find that the potatoes which were not coated with land plaster produced 177.6 bushels, and those which were coated with land plaster produced 187.7 bushels per acre. In the average results for the five years, therefore, the sprinkling of seed potatoes with land plaster, or gypsum, increased the yield by fully 10 bushels per acre throughout Ontario.

Experiments With Fertilizers on Farm Crops.

Within the past twelve years a considerable amount of work has been done in testing a few characteristic fertilizers with some of the principal farm crops grown in Ontario. Both the fertilizers and the seeds were sent from the College to the experimenters in each of the years. In every instance, the nitrate of soda and the muriate of potash were applied at the rate of one hundred and sixty pounds per acre, and the super-phosphate at the rate of three hundred and twenty pounds per acre. The mixture, or complete fertilizer, was composed of one-third of the amount of these fertilizers, making in all two hundred and thirteen and one-third pounds. In all cases, the nitrate of soda was applied when the plants were about three inches in height, and the muriate of potash and superphosphate at the time of sowing the seed. The cost price of each of the fertilizers amounted to about $4.60 per acre. Farm yard manure has only been used in the experiments of the past three years. The advice to each experimenter was to apply five hundred pounds of average cow manure per plot, the application being equal to twenty tons per acre. The cow manure was mixed with the soil to a depth of from four to five inches, and the fertilizers were stirred into the soil to a depth of from one to two inches.

Fertilizer Experiments.

Oats, Mangels, Fodder Corn, and Swede Turnips.

Kind of Fertilizer used.	Fertilizer, per acre.	Average yield per acre.				
		Oats.	Mangels.	Fodder Corn.		Swede Turnips.
		5 years.	5 years	Whole Crops. 6 years.	Husked Ears. 6 years.	3 years.
		74 tests.	41 tests.	43 tests.	38 tests.	6 tests.
	lbs.	bus.	tons.	tons.	tons.	tons.
Nothing		38.9	20.6	8.2	2.8	24.0
Nitrate of Soda	160	46.3	26.5	9.7	3.2	26.1
Muriate of Potash	160	43.8	24.6	9.8	3.1	26.7
Superphosphate	320	43.6	24.2	9.4	3.2	28.1
Complete Fertilizer	213	48.7	25.4	9.6	3.3	29.3
Cow Manure	40,000					32.5

Experiments have now been conducted throughout Ontario by applying fertilizers to oats for five years, to mangels for five years, to fodder corn for six years, and to Swede turnips for three years. The results for 1904 are confined to the experiments with fertilizers on Swede turnips. In the

average of experiments in applying fertilizers to Swede turnips in 1902, 1903, and 1904, the results show the number of tons of turnips from each application of fertilizers to be as follows : Farmyard manure, 32.5 tons; Complete fertilizer, 29.3 tons; Superphosphate, 28.1 tons; Muriate of Potash, 26.7 tons; Nitrate of Soda, 26.1 tons; and the unfertilized plot gave an average of 24 tons of roots per acre. Of the different commercial fertilizers used, the Mixed Fertilizer, therefore, gave the largest yield per acre, the increase over the unfertilised plot being about 175 bushels per acre. The increase was produced at a cost of about 2.6 cents per bushel.

During the six years in which the fertilizers were applied to fodder corn, forty-three complete and satisfactory reports were received. The unfertilized land gave the lowest yield per acre in each of the years, and the muriate of potash produced the highest yield in five out of the six years during which time this test was made. An application of one hundred and sixty pounds of muriate of potash per acre increased the yield of the corn 1.6 tons. This was accomplished at a cost of about $2.87 per ton for the fertilizer used.

During the five years in which fertilizers were used with mangels, forty-one good reports of successfully conducted experiments were received. These show that the smallest average yield was produced from the unfertilized plot, namely, 20.6 tons per acre, and that the largest average yield was produced from the nitrate of soda, namely, 26.5 tons per acre. As in the case with corn, the unfertilized land gave the lowest yield in each year. The nitrate of soda produced the highest yield in four out of the five years. The average of 197 bushels of mangels per acre produced by the nitrate of soda over the unfertilized land was obtained at a cost of about 2.3 cents per bushel. The nitrate of soda produced the largest yield on both heavy and light soils, but on the black loams the muriate of potash gave the highest yield of mangels. The nitrate of soda showed the greatest influence upon the light soils, as in the average of fifteen experiments, the land which was fertilized at the rate of one hundred and sixty pounds of nitrate of soda per acre gave an average yield of $7\frac{3}{4}$ tons per acre more than the land which was unfertilized.

Seventy-four good reports of successfully conducted experiments in applying fertilizers to oats were received during the five years in which this experiment was conducted over Ontario. The lowest yield was obtained from the unfertilized land, viz., 38.9 bushels per acre; and the highest average yield from the complete fertilizer, 48.7 bushels; and the nitrate of soda, 46.3 bushels per acre. The unfertilized land produced the lowest yield per acre in each of the five years. The mixed, or complete fertilizer, gave the largest yield of oats per acre in the average results of this experiment for each of the years in which it was conducted. Although the land which received the mixed fertilizer gave an average of 9.8 bushels of oats per acre more than the unfertilized land, still this increase was produced at a cost of about 47 cents per bushel. The mixed fertilizer gave a larger average yield than no fertilizer on heavy soils by 12.7 bushels per acre, on light soils by 10.2 bushels per acre, and on black mucky soils by 7.1 bushels per acre.

In the co-operative experiments with different manures applied to winter wheat in the spring of the year, the average yields of grain per acre for the past two years are as follows: Cow manure, 30.2 bus.; mixed fertilizer, 30.2 bus.; nitrate of soda, 26.4 bus.; superphosphate, 25.8 bus.; muriate of potash, 25.1 bushels. The unfertilized land gave an average of 21.2 bushels per acre. The cow manure was applied at the rate of 20 tons, superphosphate 320 pounds, and muriate of potash and nitrate of

soda, each 160 pounds per acre. The mixed fertilizer consisted of one-third of the quantity of each of the last three fertilizers here mentioned. The usual cost of the fertilizers as used in these experiments is from three to three and a half cents per pound.

Experiments With Sweet Corn.

In order to encourage a more general cultivation of some of the best varieties of sweet corn, three kinds were distributed throughout Ontario in 1904. The results of the successfully conducted experiments show that the varieties were ready for table use as follows : Mammoth White Cory in 71 days; Crosby in 89 days; and the Country Gentleman in 115 days, or a difference of 44 days between the time that the first and the last varieties were ready for use. The Mammoth White Cory produced the greatest number, and the Country Gentleman the smallest number of ears. No doubt the peculiar season had something to do with the difference in the table quality of the three varieties, as the Country Gentleman did not properly mature this season. According to the reports of the experimenters, the Mammoth White Cory and the Crosby were the two most popular varieties. The following table gives the average results of the three varieties for 1904.

Experiment.	Varieties.	Comparative value.	Table quality.	Comparative number of ears.	Number of days until ready for table use.
Sweet corn (8 tests)	Mammoth White Cory	100	100	100	71
	Crosby	61	93	79	89
	Country Gentleman	48	59	51	115

Methods of Planting Corn.

For five years, an experiment has been conducted throughout Ontario in planting corn in squares, or hills, in comparison with planting corn in rows, or drills. The same amount of seed was used in both cases. The rows were three feet apart and the grains of corn nine inches apart in the rows, and the hills were three feet apart each way, having four kernels in each hill. Each plot was four rods square, thus containing sixteen square rods, or one-tenth of an acre. In each of the five years that the experiment has been conducted, the average results, both as regards total crop and yields of ears per acre, have been somewhat in favor of planting in squares, or hills, the average being about one ton of total crop per acre, of which about one-quarter would be in the form of ears.

Methods.	Yield per acre (tons).			
	Husked ears.		Whole crop.	
	1904	Average 5 years.	1904	Average 5 years.
	1 test.	29 tests.	4 tests.	32 tests.
Corn planted in squares or hills	2.14	2.75	13.94	11.6
Corn planted in rows or drills	1.58	2.48	13.22	10.6

Q.—How does the quality of grain of Early Ripe variety of oats compare with that of the Daubeney variety ?

A.—There is not much difference; each variety is very thin in the hull, having between 26 and 27 per cent.

Q.—What is the difference in date of ripening between Liberty and Siberian oats ?

A.—Siberian is two or three days earlier than the Liberty in reaching maturity.

Q.—Does Emmer do well in a mixture ?

A.—Emmer, when mixed with oats, has not given very good results. It does not seem to stand crowding as well as barley or oats. I have heard of a few cases where Emmer and oats have done well together.

Q.—How does the Prussian Blue pea compare with other varieties ?

A.—Where the land is comparatively poor, it will give good results in grain; but on rich soil it goes too much to straw. We used it for our co-operative experiments for several years.

Q.—What has been the experience with the weevil this year ?

A.—I am unable to answer that question from the results of the experiments, because we distributed peas in the northern part of the Province, which is free from the pest.

Mr. Mason: In the Lake Erie counties, they are now beginning to grow peas successfully again.

Prof. Zavitz : The area devoted to the pea crop over Ontario has dropped from over 800,000 acres some six years ago to a little over 300,000 acres in 1904. Now that the acreage is low, great efforts should be made to check the ravages of the pea weevil in those parts of the Province where the insect is still troublesome.

Q.—If the seed be kept over a year, will not the weevil be destroyed ?

Prof. Zavitz: In nearly all cases they would be destroyed, providing they were prevented from escaping during the year. If they escaped they would lay their eggs on the new crop of peas. The best plan is to keep the acreage down and kill all the bugs possible by fumigation with carbon bisulphide. One pound of carbon bisulphide applied to from 50 to 100 bushels of peas, which had been placed in an air-tight chamber, would destroy all the weevils, or bugs, in forty-eight hours. The treatment is simple, cheap, and very effectual in killing the bugs which are carefully treated by the method here mentioned.

Q.—How do the New Danish Improved and Royal Giant varieties of sugar beets compare as to pulling qualities?

A.—Both varieties are pulled with comparative ease. Such varieties as the Kleinwanzlebener and Pitzscheke's Elite are very difficult to pull.

Q.—What is the difference in feeding value between mangels and beets ?

A.—Prof. Day conducted experiments in feeding mangels and sugar beets to milch cows for two years, and the results obtained were practically the same, with equal quantities of each. He thinks that sugar beets would give better results than mangels in beef production, owing to the feeding value of the sugar which the beets contain.

Q.—Are sugar beets as hard on the soil as mangels ?

A.—I do not suppose there is much difference in the comparative amount of mineral matter which is taken from the soil by the two crops.

Q.—Are they cultivated the same as for sugar ?

A.—For feeding purposes, the beets are treated about the same as mangels, but the beets are left a little closer together in the row.

Q.—Do you recommend planting in drills or on the flat ?

A.—We have had rather better results planting on the flat, the average being about one ton more per acre.

Q.—Has anyone used parsnips for stock feeding ?

Mr. Mason : I have used them for hogs, leaving them in the ground over winter and allowing the hogs to dig them. I found them quite satisfactory.

Q.—What varieties of shipping turnips do you recommend ? This year I grew the Canadian Gem, obtaining the seed from Hunter of London. The inspector pronounced them the best shipping turnips he had seen. We require a medium sized smooth turnip for shipping. We have been using Hartley's Bronze Top, and another variety, but they have been going out of favor and we would like something to take their place.

A.—We have not tested the Canadian Gem. We grew some thirty varieties in 1904. After they were pulled and lying in heaps in the field, they were inspected by the principal turnip shipper in Guelph, and by a representative of the Carter Seed Co., of England. The variety they pronounced the best was Carter's Invicta Bronze Top, which we grew in 1904 for the first time. It yielded exceptionally well and produced a very uniform lot of roots. Other varieties which were pronounced good were the Hall's Westbury, Sutton's Queen, Carter's Prize Winner, Sutton's Champion, and Rennie's Prize Purple Top.

Q.—How does White Cap Yellow Dent corn compare with Leaming in maturing qualities ?

A.—It is about the same as the latest variety of Leaming—a good deal later than Rennie's Improved Leaming.

Q.—Do you know anything of Pencilaria ?

A.—We purchased some two years ago, paying 90 cents per pound for the seed. We found that Pencilaria was another name for Pearl Millet, which we had grown for years, and which had proved to be unsatisfactory for growing in Ontario.

Q.—How soon do you plant potatoes after cutting ?

A.—We get decidedly the best results by planting immediately after cutting. As the result of many experiments, we obtained an average of about fifteen bushels per acre more from potatoes cut and planted immediately as compared with those which were not planted for five days after the seed was cut.

Q.—Why is the use of land plaster an advantage ?

A.—I do not know that I can offer an explanation.

Q.—How many eyes do you leave on each piece, and how many pieces are planted to the hill ?

A.—We obtained the best results from taking good sized potatoes and cutting them into pieces of about 1½ ozs. each. If seed is scarce, the pieces should average about an ounce; if plentiful, I prefer two ounces. There should be from three to four eyes on each piece.

Q.—Do you spray to prevent rot ?

A.—We have sprayed here at the College and have obtained advantages therefrom; but we have conducted no co-operative experiments throughout Ontario along this line.

Q.—Are any of the new varieties free from rot ?

A.—Some of the early varieties are comparatively free. There is a marked difference in varieties regarding the susceptibility to rot. I do not know that we have a variety entirely free from rot.

Mr. Clark : It seems to be the opinion that the white skinned varieties are more susceptible than the dark skinned.

A.—Some of the dark skinned varieties do not rot very badly. The Stray Beauty, which is a red skinned potato, is comparatively free from rot.

Mr. Clark : The Silver Dollar is claimed to be immune. It is grown in Prince Edward Island and shipped to the West Indies.

Prof. Zavitz : In the year 1897, the Silver Dollar was considerably rotted at the College.

Mr. Mason : We grow very early varieties and plant them early, and they are practically free from rot.

Prof. Harrison : Were potatoes coated with land plaster less susceptible to rot than those not coated ?

A.—We did not ask this question of the experimenters, but from our own results there was apparently no difference.

Q.—Is there any way of preventing rot from spreading among potatoes after they are dug ?

Mr. Mason : Dusting them with air slacked lime is considered by some to be a preventive.

Q.—Has the lime any effect on the quality or germination ?

A.—It has no effect.

Q.—Is there any advantage in leaving blighted potatoes in the ground as long as possible before they are dug ?

A Member : We did this on Mr. Hodson's farm, and got better results. It is the practice in our neighborhood.

Q.—Have you tried cutting off the tops as soon as potatoes begin to blight ?

Mr. Mason : If you are not prepared to spray thoroughly, the best plan is to select early varieties and plant them as early as possible in the spring. I sold Early Ohio in a district where potatoes rotted very badly last year and they were immune this year.

CO-OPERATIVE EXPERIMENTS WITH SMALL FRUITS.

By Prof. H. L. Hutt, O.A.C., Guelph.

As director of the co-operative experiments in Horticulture, I am pleased to report that good progress has been made in the co-operative testing of the leading varieties of small fruits throughout Ontario.

This work was begun eleven years ago by sending out plants of a few of the leading varieties of strawberries, raspberries, and currants. From year to year other classes of small fruits have been included in these experiments, and we are now sending out all of the various classes of small fruits usually cultivated in this country, viz., strawberries, red, white, purple, and black raspberries, blackberries, red, white, and black currants, and English and American gooseberries. At first there were but 60 experimenters engaged in this work. Now we have on our books the names of 1,500 experimenters to whom plants have been sent. This year plants were sent to 393 experimenters. During the past eleven years 2,581 lots of plants have been sent out. These contain a total of 45,452 strawberry plants, 7,752 red, white, and purple raspberry plants, 8,016 black raspberry plants, 6,404 blackberry plants, 3,378 red and white currant bushes, 720 black currant bushes, and 4,228 gooseberry bushes, making a total of 75,950 plants distributed.

These plants have gone into every county and district in the Province, and, on the whole, have been most sought for and most prized in those northern districts where fruits have not been so extensively cultivated.

In this way these experiments have encouraged the growing of small fruits for home use where they are most needed.

Plan of Distribution.

The following circular, which was sent out last February, gives a list of the varieties of fruits offered for testing, also particulars as to the plan of distribution :

Dear Sir,—Through the agency of the Experimental Union, arrangements have again been made for furnishing plants for a number of co-operative experiments with small fruits.

The varieties for the several experiments offered this year are as follows:

I. Strawberries—Clyde, Tennessee, Irene and Van Deman—12 plants of each.

II. Raspberries—Cuthbert, Golden Queen, Marlboro', and Columbian—6 plants of each.

III. Black Raspberries—Gregg, Kansas, Palmer, and Older—6 plants of each.

IV. Blackberries—Agawam, Gainor, Kittatinny, and Snyder—6 plants of each.

V. Currants—Fay, Raby Castle, Victoria, and White Grape—2 plants of each.

Black Currants—Champion, Lees, Naples, and Black. Victoria—2 plants of each.

VII. Gooseberries—Downing, Pearl, Red Jacket, and Whitesmith—2 plants of each.

Each person wishing to join in the work, may do so by choosing one of the experiments, and signing the agreement contained in the accompanying form of application. The experiment selected may be indicated by number. It is well for each applicant to make a second choice, in case he may be too late for the first. The supply being limited, plants will be furnished in the order in which the applications are received; those who apply promptly will be most likely to receive what is asked for.

Instructions for conducting the test will be sent to each experimenter before the plants are mailed, and blank forms will be furnished from year to year, upon which to report the results. All will be furnished free of charge, and the plants and produce become the property of the experimenter. In return, we expect that each experimenter will follow the instructions given, and will report each year, as requested, upon the growth and yield of each variety under test.

These plants are purchased from nurserymen at considerable expense, and, as the funds at our disposal for this purpose are limited, we can seldom furnish plants to more than half of those applying for them. We would like, therefore, that they go to those only who will make an honest effort to make the experiment a success, and we trust no one will apply for plants unless he is prepared to make such an effort, and will report the results as requested.

Trusting that your interest in the work may lead you to become a successful experimenter.

Application for Plants.

The following form of application, which is sent with the circular offering the plants for testing, states the conditions upon which the plants are furnished, and when signed by the applicant is an agreement on his part to follow the directions furnished and to report the results :

Dear Sir,—Kindly forward to me the plants for the experiment which I have selected as indicated below. If my application is received in time to entitle me to them, I agree

1. To conduct the experiment according to directions furnished.

2. To look after the plants and exercise care and accuracy in reporting the results.

3. To report upon the growth and yield of each variety at the end of each season as requested.

Name.....

Post Office .....

County .....

Experiment chosen (Indicate by number) 1st choice .....

2nd choice .....

Address all communications to

General Directions to Experimenters.

In March, when most of the applications had been received and the lists were made up of those to whom plants were to be sent, the following circular was sent informing them that they might expect the plants, and giving general directions for conducting the experiment :

Dear Sir,—I am pleased to inform you that your application for plants for co-operative testing was duly received, and that the plants will be forwarded to you as soon as the weather is suitable for planting. If they cannot be planted as soon as they are received, they should be unpacked, so that the roots may be spread out and buried in moist earth; but the sooner they can be permanently planted, the better.

The soil upon which they are to be planted should be as uniform as possible, so that all varieties may have an equal chance.

As soon as planted, each variety should be carefully labelled. Stout wooden stakes painted white, written on plainly with a lead pencil, and driven firmly into the ground answer the purpose well. It is advisable, also, to make a record of the planting in a note-book, in case a label should at any time be lost.

I trust you will follow the directions carefully, and that you will not allow poultry or trespassers to interfere with the fruit. The weight of the entire crop from each variety is one of the most important items desired in your annual report; and, in order that this may be given accurately, it will be necessary for you to carefully weigh and record each picking, so that the total yield of each variety may be reported at the end of each season. Blank forms will be mailed to you in due time each season upon which to make such report.

The value of this experiment depends largely upon the attention given to it. I trust you will find it both interesting and profitable. From this small collection of plants you may, in time, by good management, propagate for yourself all the plants you wish, without interfering with the value of the experiment in the least.

Should you require any further information regarding the work, kindly let me know, and I shall be glad to give all the assistance possible.

Accompanying the general directions, a set of special cultural directions was also sent for each class of fruit under test. These cultural directions are here given in connection with each experiment:

Experiment with Strawberries.

Cultural Directions.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of barnyard manure.

2. Set the plants in rows, at least four feet apart and about eighteen inches apart the row. If two or more varieties are planted in the same row, leave a space of least three feet between them to avoid mixing of the runners.

3. The best method of planting is to use a spade, thrusting it deeply into the ground, then pressing it backwards and forwards. Into the opening thus made, spread the roots fan-shaped, and pack the soil firmly about them with the foot.

4. Give clean, thorough cultivation throughout the season, and never allow the soil to become crusted.

5. Pinch off all blossoms the first season, that the plants may make vigorous growth and not waste their energies trying to produce fruit.

6. Confine the runners of each variety to its own row, allowing them to form matted rows about a foot and a half wide. If any of the plants should die, place the runners of the adjoining plants so that they will fill up the spaces.

7. As soon as the ground is frozen in the fall, cover the whole plantation with a inch or two of strawy stable manure. When danger of frost is over in the spring, rake the coarsest of this covering off the plants and tread it down between the rows for a mulch. If it is not thick enough to keep down weeds and retain moisture, more may be added, at any time in the spring.

8. To continue to experiment from year to year, a similar plantation should be set out each spring, taking a dozen new plants of each variety from the plots set out the year before. The old plots may be plowed up after the second crop is off.

9. Carefully weigh and record the weight of each picking from each variety, and report as soon as possible after the fruiting season.

The varieties sent out this year were : Clyde, Tennessee, Irene, and Van Deman. Plants were sent to 166 experimenters, 74 of whom have reported on the growth of the plants this season. Some report that all the plants lived, and did well, others report that quite a number failed, and a few report total failure. Strawberry plants lose their vitality more readily than most other plants, and we usually expect quite a few failures among plants which are sent long distances by mail. If the experimenters succeed however in saving a few plants of each variety they are soon able to get plenty of plants of their own growing to set out a new plantation. And with plants of their own growing much better results may be expected in planting. So that all of our strawberry experimenters are asked to continue the experiments with plants of their own growing.

Last year plants were sent to 119 experimenters, 83 of whom reported on their growth at the end of the season, and 43 reported this year on the results of the cropping. Irene appears to have given, on the whole, the heaviest yield, while Tennessee ranks second and Clyde third. Van Deman is not a heavy yielder but is valuable on account of its earliness. Irene is one of the latest and on account of its beautiful dark color is valuable for canning. Clyde is a good, showy table variety, but too light in color for canning.

The varieties sent out in 1902 were Clyde, Tennessee, Saunders, and Van Deman. Twenty-five of the experimenters who received plants at that time reported this year on the plots of their own growing. The honors for first place seem equally divided between Clyde and Tennessee. With some growers Clyde does best and with others Tennessee does best. Herein lies the value of this co-operative work, for each experimenter find out what does best on his own particular soil.

The following circular was sent out early in the spring to all of the experimenters who had received strawberry plants in the spring of 1903 to encourage them to continue the work with plants of their own growing for it is only by planting every year with fresh home grown plants that the best results with strawberries are obtained :

Dear Sir,—As you are one of our co-operative experimenters who received strawberry plants last spring, I take this opportunity of requesting that, if possible, you will continue the experiment by setting out a new plantation this spring, taking a dozen young plants of each variety from the plots set out last year.

I make this request because our experience has shown that good home-grown plants are always more satisfactory than those obtained from a distance. If, then, you can set out a new plantation with plants of your own growing, you may reasonably look for much better results than from the plants obtained from us.

If any of the varieties have not lived, or have failed to make enough plants, you will, of course, be unable to conduct the experiment in full. Nevertheless, you will find it to your advantage to set out new plots of the varieties you have.

In making a new plantation, the same general directions, as given last year, should be followed.

Should you require any further information regarding the work, kindly let us know, and I shall be pleased to give all the assistance possible.

Experiment with Red, White and Purple Raspberries.

Cultural Directions.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of manure.

2. Plant in rows five or six feet apart, with plants five feet apart in the row.

3. Give clean, thorough cultivation until about the beginning of August, and never allow the soil to become crusted.

4. Pinch off any blossoms which may form the first year, that the plants may not waste their energies trying to produce fruit.

5. Do not allow the varieties to become mixed by letting the suckers grow between the bushes.

6. In the fall, or early in the spring, cut out all old canes that have fruited, and leave about six of the strongest new canes to each bush. Shorten the ends of these to a uniform height, making the bushes uniform and symmetrical.

7. In northern localities, where winter protection is needed, bend down the canes late in the fall, and cover the tops with earth to keep them under the snow.

8. Should any spaces have to be filled, or should the experimenter wish to increase his stock of any of the varieties, it may readily be done by taking up the young suckers which spring up about the bushes. Columbian is propagated by bending down and covering the tips of the new canes in August. They will make good plants by the next spring.

9. Carefully weigh and record the weight of each picking from each variety, and report as soon as possible after the fruiting season.

The varieties for this experiment were Marlboro', Cuthbert, Golden Queen, and Columbian. Forty-six lots were sent out, and 32 reported this fall upon the growth of the plants. The reports show that the plants have not done so well as usual this year. For some reason or other the plants seem to have been weakened by the winter or by handling before they were sent out from the nursery.

Twenty-three experimenters report upon the plants sent out last year, and 14 upon those sent out in 1902. In most cases Columbian has given the heaviest yield. Cuthbert comes second and Golden Queen and Marlboro' in the order named. These four varieties make a choice collection for family use to cover the season ; Marlboro' is one of the best early reds, Cuthbert the best late red, while Golden Queen is the best yellow variety, and Columbian, a purple kind, is the most productive of all, although not so much esteemed in the market because of its dull dark color.

Previous to 1901 Shaffer was sent out instead of Columbian, and all those who have reported this year on the plants sent previous to that date say that Shaffer has yielded more than any of the other varieties. There is not much difference between the Shaffer and Columbian, except that the Columbian is apparently less subject to Anthracnose on the canes.

Experiment with Black Raspberries.

Cultural Directions.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of manure.

2. Plant in rows five or six feet apart, with plants five feet apart in the row.

3. Give clean, thorough cultivation until about the beginning of August, and never allow the soil to become crusted.

4. Pinch off any blossoms which may form the first year, that the plants may not waste their energies trying to produce fruit.

5. To make the bushes stout and stocky, pinch off the ends of the new canes during the early summer, when they are two or three feet high.

(In northern localities, where winter protection is needed, this should not be done, as the canes should grow long and slender, that they may be more easily laid down.)

6. In the fall, or early in the spring, cut out all old canes that have fruited, and leave about six of the strongest new canes to each bush. Shorten the ends of these to a uniform height, making the bushes uniform and symmetrical.

7. In northern localities, where winter protection is needed, bend down the canes late in the fall, and cover the tops with earth to keep them under the snow.

8. Should any spaces have to be filled, or should the experimenter wish to increase his stock of any of the varieties, it may readily be done by propagating new plants from the tips of the new canes, which should be bent down and covered with earth in August. They will make good plants by the next spring.

9. Carefully weigh and record the weight of each picking from each variety, and report as soon as possible after the fruiting season.

For this experiment the varieties were : Kansas, Gregg, Palmer, and Souhegan. Fifty-three lots of plants were sent out, and thirty-seven have reported so far on the results of their planting. On the whole, they have been more successful than usual with the blackcaps, and most of the experimenters will be able to fill up any spaces in their plots with plants of their own growing.

Forty reports have been received upon the fruiting of plants sent out previous to last year. These show that there is quite a diversity of opinion as to which is the best black raspberry. Some report that Gregg has given the best results with them, others prefer Palmer, and others again say that Kansas has given the best results. As one or two varieties is as many as is usually wanted of these, each experimenter may propagate for himself the varieties which have done best in his particular soil or locality.

Experiment with Blackberries.

Cultural Directions.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of manure.

2. Plant in rows five or six feet apart, with plants five feet apart in the row.

3. Give clean, thorough cultivation until about the beginning of August, and never allow the soil to become crusted.

4. Pinch off any blossoms which may form the first year, that the plants may not waste their energies trying to produce fruit.

5. To make the bushes stout and stocky, pinch off the ends of the new canes during the early summer, when they are two or three feet high.

(In northern localities, where winter protection is needed, this should not be done, as the canes should grow long and slender, that they may be more easily laid down.)

6. In the fall, or early in the spring, cut out all old canes that have fruited, and leave about six of the strongest new canes to each bush. Shorten the ends of these to a uniform height, making the bushes uniform and symmetrical.

7. In northern localities, where winter protection is needed, bend down the canes late in the fall, and cover the tops with earth to keep them under the snow.

8. Should any spaces have to be filled, or should the experimenter wish to increase his stock of any of the varieties, it may readily be done by taking up the young suckers which spring up about the bushes.

9. Carefully weigh and record the weight of each picking from each variety, and report as soon as possible after the fruiting season.

The varieties of blackberries distribute were: Agawan, Gainor, Kittatinny, and Snyder. Forty-two lots were sent out this year, and the plants have evidently done well, as the majority of the experimenters report most of the plants living. Forty-five experimenters report on the plants sent out previous to last year, and the majority of them mention that the bushes were more or less severely injured by the severity of last winter. Agawan has on the whole proved the most satisfactory, being the hardiest and most productive.

Experiment with Red and White Currants.

Cultural Directions.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of manure.
2. Set plants five feet apart each way, in one or more rows, as convenient.
3 Give clean, thorough cultivation until about the first of August, and never allow the soil to become crusted.
4. Look out for currant worms on the lower parts of the bushes soon after the leaves are fully grown. They may be destroyed by spraying with hellebore (one oz. to three gallons of water), or Paris green (one oz. to ten gallons of water).
5. Prune early every spring. A good method of pruning is to leave six branches to form the bush, then keep up a renewal of new wood by cutting out, every year, two of the oldest branches, and allowing two strong new ones to take their place. Cut out all other new canes, and shorten back the new wood left nearly one-half.
6. Carefully weigh and record the weight of the crop from each variety, and report as soon as possible after the fruiting season.

For the red and white currant experiment the varieties selected as the best for distribution were : Fay, Raby Castle, Victoria, and White Grape. During the past ten years 304 lots of these have been distributed, an average of about 30 lots a year. Currants are among the best plants to retain their vitality in shipment, and as a rule the experimenters succeed in getting all the plants to grow. Eighty reports have been received this year upon this experiment, and although the results of yields vary in some cases, on the whole Victoria and Raby Castle have been the most productive; but Fay is a favorite because of its large fine berries, and White Grape is one of the best white currants.

Experiment with Black Currants.

Cultural Directions.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of manure.
2. Set plants five feet apart each way, in one or more rows, as convenient.
3. Give clean, thorough cultivation until about the first of August, and never allow the soil to become crusted.
4. Prune early every spring. A good method of pruning is to leave six branches to form the bush, then keep up a renewal of new wood by cutting out, every year, two of the oldest branches, and allowing two strong new ones to take their place. Cut out all other new canes, and shorten back the new wood left nearly one-half.
5. Carefully weigh and record the weight of the crop from each variety, and report as soon as possible after the fruiting season.

Plants for the black currant experiment were distributed for the first time in the spring of 1903. The varieties sent out were Champion, Lees, Naples, and Black Victoria. Ninety experimenters have already taken up this experiment, 43 last year and 47 this year. Seventy have so far reported upon the growth of the plants. Nearly all say that the plants have lived and done well. It is too soon yet to make a comparison of the yields, although many of those who received plants in 1903 report a light crop on these young bushes.

Experiment with Gooseberries.

Cultural Directions.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of manure.
2. Set plants five feet apart each way, in one or more rows, as convenient.
3. Give clean, thorough cultivation until about the first of August, and never allow the soil to become crusted.

4. Look out for currant worms on the lower parts of the bushes soon after the leaves are fully grown. They may be destroyed by spraying with hellebore (one oz. to three gallons of water), or Paris green (one oz. to ten gallons of water).

5. Whitesmith is subject to mildew. This may to a great extent be prevented by spraying with potassium sulphide (one oz. in two or three gallons of water). It should be applied early in the season, just as the buds are swelling, and five or six times afterwards, at intervals of ten days or two weeks.

6. Prune early every spring. A good method of pruning is to leave six branches to form the bush, then keep up a renewal of new wood by cutting out, every year, two of the oldest branches, and allowing two strong new ones to take their place. Cut out all other new canes, and shorten back the new wood left nearly one-half.

7. Carefully weigh and record the weight of the crop from each variety, and report as soon as possible after the fruiting season.

The varieties sent out for the gooseberry experiment for several years past have been : Pearl, Downing, Red Jacket, and Whitesmith. The first two are American varieties and the last, one of the large fruited English varieties. Red Jacket is a hybrid between the American and English species. During the last four years 176 lots of these have been distributed, 40 being sent out this year. This year's plants have not done as well as usual, no doubt owing to their late delivery from the nursery where they were purchased. This we hope to be able to avoid another year. Seventy-three experimenters reported upon the yields from the bushes sent out from 1901 to 1903. With but few exceptions, Pearl is reported as the most productive. Downing, which resembles Pearl very closely, makes a close second, while Red Jacket and Whitesmith rank in the order named. Both of these varieties produce large, handsome berries. The latter is quite subject to mildew, although it was apparently freer of it this year than usual. Wherever it can be grown free from mildew it is a favorite variety, because of its large size and handsome appearance.

A Member : With regard to strawberry culture, I think that what we need is not so much new varieties as the old varieties bred up. I should like to see the Union take up some of our commercial varieties, and, by careful selection, as in the breeding of live stock, breed them up to a higher standard of excellence and productiveness.

Prof. Hutt : It is first necessary that we test all of the old and new varieties to ascertain which are the best. We have been doing this now for almost eleven years, and for the last three years we have taken a number of those that have proved to be the best and have been crossing them in an endeavor to obtain better varieties. Plant breeding is very slow work, but we hope in time to be able to produce an ideal berry.

W. H. Bunting, St. Catharines : Many of the farmers look upon the growing of fruit and vegetables for their own use as a small and unimportant part of their farming operations, and, as a rule, it falls to the lot of the woman of the house to look after it. Generally this is the most disreputable part of the farm. I should like to make a suggestion in reference to methods of cultivation. If, in setting out fruit, you would plant in long rows and do the work with a horse cultivator, you could have fruit with a minimum of labor. You ought to have plenty of fruit for your own use ; no man is better entitled to the best of our fruit than the tiller of the soil, and yet, as a rule, the people in the towns have better varieties of fruit and more of it than we have on the farms.

CO-OPERATIVE EXPERIMENTS IN POULTRY WORK.

By W. R. Graham, B.S.A., O.A.C., Guelph.

We have been trying for the last few years to get some reliable data regarding the operation of incubators. This year, out of fifteen experiments, only two were conducted successfully. This was owing, I think, largely to the failure of experimenters to give the attention required in filling out their charts accurately. I know of no way of securing the data necessary without employing a chart of this kind, and I think that, as we have failed to secure it from our experimenters, we shall have to adopt the plan of obtaining it through the Dominion Chicken Experiment Stations and the Poultry Department at Ottawa and Guelph, and shall certainly be pleased to have any poultry keepers join in the experiment.

The results so far point clearly to the fact that incubators can be successfully operated in almost all well ventilated rooms where there is not too much variation of temperature. Many of the best hatches are made where the machine is run in an unused bedroom. I think I would also be safe in saying that eggs require very liberal airing during the last week of incubation.

Mr. Baldwin, Deer Park: It should not be difficult to fill out the chart if the work is done at the time. It can be done very easily while the eggs are being cooled each day. If it be put off for a day or two and then an attempt be made to fill out the chart, failure is sure to be the result. I think that if experimenters realized the advantages they would often derive from these charts, there would be less difficulty in inducing them to keep them. In my own case, for example, I had one hatch this year that was far superior to any of the others; there was practically no mortality. In looking back over the season's work, the question naturally arises, why was this particular hatch so successful? To answer that question, I look up the record of that hatch on the chart, and learn exactly what occurred. What did occur was something unusual. It had been my custom to have the egg a shade warmer, perhaps half a degree, in the earlier stages of the hatch than in the later stages. In this instance the eggs were cooler in the earlier part of the hatch than in the later. The question naturally arises, is it desirable that the eggs should be cooler during the first ten days of the hatch than has been the practice hitherto? I am unable alone to answer that question; the result, also, may have been due to an entirely different cause than the variation of temperature. If we had a number of persons experimenting with incubators, we might find someone who had had similar experience, and on comparing notes we might find a basis on which to form a judgment.

I had another interesting experience this year. In selecting eggs for sale for hatching purposes, I have carefully discarded all that are mottled in the shell, or too clear in the shell, being under the impression that such eggs are not likely to give the best results. I determined this year to fill an incubator with these discarded eggs. When the time arrived for testing the fertility of the eggs in the machine, I was surprised to find that those I had marked "mottled," and "too clear," showed just as good fertility as those selected as good hatchable eggs; and finally they hatched out just as well. The experience of other experimenters would be useful in this connection.

Robert Thompson, St. Catharines: A year ago we had a remarkable hatch. About 88 per cent. of the eggs hatched, and all lived except two or three. The temperatures were not worked out, however.

John Clark, Onondaga: My experience is that we do not air the eggs sufficiently. Once by accident I left the eggs out of the incubator for a whole day with the temperature of the room about 60 deg. I naturally expected to lose the hatch, but it turned out to be the best one that season.

HOW TO FARM SUCCESSFULLY WITH AS LITTLE HELP AS POSSIBLE.

Discussion.

T. H. Mason, Straffordville, Elgin Co.: So far as the larger farms in Ontario are concerned, we shall have to introduce the system adopted in the West; that is, using more horse labor and larger implements, so as to make one man do the work of two. This system, however, can hardly be applied to the smaller farms of the Province. In some districts where the soil is specially suitable, the question is being solved by putting more of the farm into grass and giving more attention to grazing; but this can only be done successfully where the rainfall is abundant. In districts where the rainfall is not sufficient, we should change the rotation and make the hogs do a considerable portion of the work of harvesting. On my farm, I intend to introduce a four year rotation : first, corn and roots; second, peas and rape to be harvested by hogs—the peas to be harvested ripe if the bugs will allow, if not, to be pastured like rape; third, grain crops, seeded down with clover and grasses, using a large portion of the clover for grazing purposes in the fourth year.

Thos. McMillan, Seaforth, Huron Co.: We follow a three year system of rotation. I have altogether from 100 to 125 acres, and of this I aim to keep from 60 to 65 acres in the rotation, and the balance is left in permanent pasture. We are engaged principally in the feeding and grazing of beef cattle, and, for this purpose, find that permanent pasture gives the best results. Our rotation is first, clover; second, corn, roots and potatoes; and third, grain crops which are seeded down. We plow once in three years, when the clover crop is plowed down in the fall for the corn crop and root crop which is to follow. The root crop is, of course, kept under surface cultivation all the time. I use the cultivator as a preparation for the grain crop following. Even the corn stubble does not give us any trouble; we have very little stubble because we cut all our corn with a hoe made specially for the purpose, and it is cut so close to the ground that there is little stubble left. A man will cut two acres in a day in this way. We apply our manure in the winter when we have comparatively little to do, after having plowed the land in the fall. By my system, I have overcome the difficult task of having to work the land in the fall of the year when it was hard and disagreeable to work. I run the farm with the assistance of one man.

Q.—How do you secure a permanent pasture?

Mr. McMillan : We sow Orchard grass, Kentucky Blue grass, Alsike, and timothy. The Orchard grass will give something green all the time, and the cattle will make a good gain on it. Many farmers make the mistake of grazing their pastures too bare. Unless that mistake is made, with the above grasses you will have a good pasture every year.

The President : I think we often do too much cultivating where it is not necessary, by not having a proper system of rotation.

A. E. Wark, Wanstead, Lambton Co.: How to farm successfully with as little help as possible is a subject which all Ontario farmers will have to solve, and the sooner the better. I sometimes think that the scarcity of help may yet prove a blessing in disguise, as we will be compelled to adopt better methods, which, when learned, will be the means of better fitting us to employ help. I think in the past a great deal of farm help was poorly employed, and, as a result, was not as remunerative as it should have been. Lack of system in our work is one reason why we require more help than would otherwise be needed. In most cases, the man whose work is systematically directed will accomplish more in dollars and cents than the man who has help and no system.

The producing of the food and the converting of the same into milk, beef, or pork, is what the majority of farmers are engaged in doing. Am I right in saying that it is the height of folly to be cultivating a large area of undrained, half impoverished soil, when the same results could be obtained on about one-half the area of well-drained soil in a proper state of cultivation? Yet this method of work goes on year after year. There is a great waste of time in working undrained land. As a rule, the land which needs draining requires from two to three times the amount of labor in preparing a seed bed, to say nothing of the time spent shovelling water furrows, the labor of which amounts to as much in two or three years as putting in the tile.

Regarding the kind of crops to grow, we must aim to produce the largest amount of cheap feed. In the county of Lambton, *corn* is king, and the silo is a necessary adjunct of corn. When we have filled the silo with corn, we have taken the first step towards securing a large amount of feed with the least expenditure of labor; as there is no way equal to the silo for handling corn cheaply.

If it is dairying we are engaged in, we should keep none but good cows. Do not attempt to milk twenty cows if you can, by any possible means, produce the same amount of milk and butter from a smaller number, as the extra cows require more time, and time is money.

Poorly planned stables are responsible for much lost time. Everything should be planned to enable one to accomplish the maximum amount of work in the minimum amount of time. Why not let the windmill water the stock while you are busy at other work? In that part of the county of Lambton in which I live, it is quite a common thing to have the grain ground at the home. The man who does the threshing brings his engine and grinder, and in a half day grinds two or three tons of grain into chops. In this way, the time of bagging and taking the grain to the mill is saved, and the cost per hundred is no greater than that charged by the miller, to say nothing of the satisfaction of knowing that you have not been cheated out of some of your grist. Another system which has been introduced this fall in connection with the threshing. The thresher carries his own gang. The farmer pays three cents a bushel and boards the men. The thresher furnishes sleeping accommodation for his men in a van which is drawn from place to place by his traction engine. So far, the plan appears to give satisfaction. The farmer is saved at least two weeks' time, as he does not need to go to help all of his neighbors to do their threshing in payment for what they have done for him. This enables him to put more work on his own land.

Another time-saver is the use of larger implements and more horse power. One man can drive three horses on a large sized implement and accomplish much more in a given time than with two horses on a smaller implement.

These are a few of the many things, which, if practised, would assist very materially in getting along with less help, and, at the same time, in keeping up the revenue. Of course we cannot adopt these methods in a day, but, by knowing them and keeping them always in view, we can make the changes as our circumstances will allow.

I. I. Devitt, Freeman, Halton Co.: Necessity is the mother of invention. The scarcity of farm laborers during the last few years has induced the more progressive farmers to devise ways and means of carrying on the farming operations with as little labor as possible, and the success which has attended their efforts is quite encouraging and leads one to think that the scarcity of laborers is really a blessing in disguise.

The land for spring crops is well prepared in the fall, and the manure hauled out in the fall and winter; then, when spring opens, the seed bed is easily and quickly prepared and the seed, which has also been well cleaned during the winter, is sown early, thus giving the crop a good early start which is essential to the best results.

The six-foot mower, the side-delivery rake, and the hay loader have eliminated much heavy labor from the hay-field; and the rack lifter, slings, and horse fork have made the barn work of hay-making easy. With the afore-mentioned appliances, two men can make and store as much as five could without, and do it with even less labor.

In the harvest field, the five-foot binder is giving place to the six and even seven foot machines with sheaf-carriers, and men are no longer sent racing after the sheaves, but merely pick and set them up where the sheaf-carrier has dropped them.

Corn has largely supplanted roots in stock feeding and in dairying districts, as it needs little or no hand cultivation and produces more food to the acre. The silo has done a great deal to cheapen the feeding of all classes of farm stock and to lighten labor. The windmill has perhaps done more to lessen the labor, especially on stock farms, than any other piece of machinery. It pumps water for the stock and also for the house, grinds grain, pulps roots, cuts feed, and supplies water for many other operations on the farm. In grinding grain alone, it saves the labor of bagging, loading, and hauling to the mill and back, and also the wear and tear of bags, wagon, and harness; while for pumping water it is invaluable. It is always out of the way when not in use, and the running expenses are practically nothing. A good man costs at least $30 per month, board and wages considered, or $360 per year—the interest at 6 per cent. of $6,000. Just imagine, $6,000 would equip the average 200 acre farm with auto-machinery, and the farmer would have nothing to do but sit in a comfortable seat and press the buttons. Why worry about the scarcity of labor?

L. W. Lang, St. Mary's, Perth Co.: It would be a very easy task, indeed, to solve this problem were it not for the meaning of the word "successfully," which, in farming, means to show a fair balance of profit on the financial scale, and, at the same time, keep up the fertility of the soil.

The one important feature in a system of farming which can be employed "successfully and with as little help as possible" is to have the heaviest rush of work confined to as few periods as possible. A method which will serve this purpose is to grow principally hay, corn, and roots, and oats as a grain crop, leaving the remainder of the farm in pasture. Keep from ten to twelve good cows per one hundred acres. Let one half of the cows suckle the calves twice a day, by putting two calves with each cow, and milk the other half of the cows. Send the milk to a cheese factory, and the money obtained will meet all ordinary expenses. Sell the

two-year-olds in the autumn, leaving only the cows, calves, and yearlings to winter. Grow principally corn and hay for winter feed, leaving only a small percentage of the land for oats. A few turnips should be grown to be fed whole to calves.

This method confines the heavy, busy period to haying time, which, with good machinery, can be easily overcome by dropping fall wheat out of the rotation. A small acreage of oats, say 15 acres on a 100 acre farm, will not require much help in the spring. The extra time at the farmer's disposal, given to shallow autmn cultivation, will give a larger yield of straw and grain. Sow from eight to ten acres of corn. It requires the least labor of any hoed crop and will supply the required amount of coarse fodder. The remaining 75 acres will produce sufficient hay and pasture.

By following this method, a farmer need not be rushed, except in the hay season, and threshing time will be reduced by half.

John Wheatley, Moore, Lambton Co.: We are getting more land into grass, keeping plenty for pasture, and cutting more hay than formerly. The growing of a hay crop requires a comparatively small amount of labor with the use of the improved machinery now on the market. We grow very few roots now, relying more on ensilage as a succulent food for stock. We are milking fewer cows now and keeping more steers.

The use of labor saving implements enables us to get our work done with a smaller amount of labor than formerly. Of those implements coming into general use within the last few years, I might mention a few as follows: The side-delivery rake, and hay loader, for use in the hay field; and the slings and fork in the barn. The corn planter and corn harvester have made it possible to grow corn more economically. The self feeder and wind stacker on threshing machines have almost cut in half the labor of threshing. The quality of work done by some of these machines may not be equal to that done in the old way, but these things have certainly come to stay.

It lightens our labors greatly to adopt the very best arrangements in the stables. To draw manure direct to the fields as soon as made in the winter, and spread upon the land at once, saves both time and labor. The low wagon should be used for hauling maure, and, in fact, for many other purposes on the farm. It is certainly a great improvement on the high wheeled wagon.

With the changed conditions under which we are working, we do well to look ahead and plan our work, and not undertake anything involving a large amount of labor, unless we are sure of a corresponding reward.

W. M. Shields, O'Connell, Ontario Co.: To succeed in farming with as little help as possible is a present day problem which is being solved by many farmers in various ways. As little help as possible usually means doing as much as possible one's self, and in trying to do so there are several qualities, which, if possessed by the farmer himself, will assist him to farm successfully.

The first quality should be *adaptability*. A farmer will find it a help to cultivate a readiness to do a piece of work differently from his usual way if it seems advisable. He should have pre-conceived ideas as to the work of the day, and yet appear to have none. He should be ready at any time to adapt his order of work to the demands of changing weather or to interruptions. A little adaptation to changed conditions may save time and time is money.

Another very helpful quality is *concentration*. Keeping one's mind on the work in hand is a tremendous power when applied to one's daily toil. It lightens labor and does wonders. It is a quality that assists one

greatly in the care and details, and successful men, we are told, have an almost inordinate love of detail. It may also be applied to one's purpose in life. One iron in the fire kept red hot is better than too many half cold. Concentration is a capital antidote for distraction, and a farmer has often a full cup of the latter.

Another quality is *good management*. The farmer has great scope for the display of good management. It may be shown in many things. In the crops, for example, they may be arranged to come to maturity in rotation, so that each may be given attention at the right time. A good manager will also make judicious use of good implements. Implements, however, when they are bought too freely, are often a drawback to successful farmers. It is good policy when work and implement agents are pushing one just to have patience and wait a little for things are not always so overpowering as they seem.

Adaptability, concentration, and good management are powerful aids to the farmer, and enables him to use to the best advantage any help he may hire. It is only the farmer's own working qualities that will make farming a success.

D. P. L. Campbell, Vankleek Hill, Prescott Co.: It is said that when Andrew Carnegie, the great multi-millionaire, bought any machine or appliance to carry on his work, he always secured the best that was to be found, and this was an important factor in attaining success. Can we not take a hint from this in order to farm successfully and with as little help as possible? It means that a man should invest in the best farm within reach, and that he should erect the best buildings thereon, secure the best implements, cultivate the land in the best manner, grow the best crops adapted to his soil, keep the best stock, and sell in the best time and at the best market.

As to the line of farming adopted, much would depend on the man. Emerson says, "Men are made each with some triumphant superiority." If a man has a particular liking for a certain class of stock, his chances of success are greater with that class than with any other, providing environment is favorable. Keeping the best animals of the different classes will bring in the best returns, and keeping no more than can be properly attended to will give the best results.

Comfortable and conveniently arranged buildings are very important, and a saving of much time and labor; also doing each piece of work promptly and thoroughly. Jobs half done mean loss of time and more work and worry. Systematic methods and carefully laid plans for performing the various operations; "A place for everything and everything in its proper place" will save time and enable a man to do vastly more and better work with less wear and tear than attempting to get along by a "happy-go-lucky" style.

Some operations, such as threshing and silo filling, require a certain number of men. In many places, neighbors exchange time. A large farm could be run by a number forming a company and each doing his share of work, and then dividing profits.

G. A. Brodie, Bethesda, York Co.: In short, the solution of the problem "how to farm successfully with as little help as possible" is to stick right at it yourself, use improved machinery of greater capacity, three horse implements right through, seed down considerably to clovers for seed production, and keep pure bred stock of all kinds.

Joseph E. Wing, Mechanicsburg, Ohio: I should like to tell you how we grow fourteen crops with one plowing. We first break the soil deep and plant with corn. We manure the ground for corn, and culti-

vate it well. The corn stubble is disced up and the land put into barley or oats and seeded down with alfalfa. We find spring barley the best nurse crop for alfalfa, sowing one and a half bushels of barley to the acre. We take off three crops of alfalfa a year for four years, and that gives us fourteen crops.

Q.—Will not alfalfa continue after that time ?

A.—Yes, but there are several reasons against it; first, the blue grass will begin to get into it in Ohio, and then, we like to get the manure on. If you allow alfalfa to go longer than four years, it is a very difficult matter to break it up.

Q.—If alfalfa was substituted for red clover in Ontario, would it not lengthen out the rotation period and decrease the amount of labor ?

Mr. Wing : I do not wish you to understand that alfalfa will decrease the amount of labor. A farm in alfalfa will produce so much more that it will take more stock to consume it, and, therefore, you will require more labor; but it will increase the revenue, and that is what we are after.

I. I. Devitt : We have found that by increasing the size of our fields we have been enabled to reduce the labor on our farm. This does away with the necessity for so many fences, and the need for constantly repairing them.

Hon. John Dryden : I think there is another side to the question we have been discussing, which has been overlooked. I want to warn young men not to undertake to work their farms with too little assistance. That is the worst mistake you can possibly make. If you have a farm of 200 acres, and only help enough to run 100 acres successfully, let the other go. Do not attempt to work 200 acres with the labor required for 100, or you will surely make a failure. It is important to discuss how we may lessen the labor of the farm, but if you undertake to lessen labor beyond a certain point, it means an additional expenditure of capital : you cannot have more horses; you cannot run by steam, or even by windmill, without the investment of more capital. Many farmers are unable to reduce the labor of the farm by these means because they have not the capital to invest in such improvements. Perhaps the best device for saving labor is the windmill. I have one that pumps water for seventy-five head of cattle and also sheep and horses, cuts hay and straw, grinds grain and pulps roots; and it is the greatest labor saver we have. I do not think it will be a great many years before under some system of co-operation we shall have electrical power supplied on the farms. These water powers, scattered all over the Province, which in the early days were used for running saw mills, will in a few years be applied to the generation of electrical energy, and by means of co-operation we shall be able to apply this power to our farming operations.

A Gifford, Meaford : The amount of machinery required to run 100 acres will run 300 acres just as easily. In our district there is a tendency to co-operate in the purchase and use of the best machinery obtainable, and by this means the plant ordinarily used on one farm may be made to serve three.

W. L. Smith, Weekly Sun, Toronto : I think that Mr. Dryden struck the right key note when he said that the object should be not to escape labor, but rather to increase labor so long as it can be made productive. In Japan, which has about the same area as Ontario, they are maintaining a population of forty-five millions, whereas we maintain only about two millions. Our object should be to make Ontario the seed ground of the continent, for grain, animals, and fruits. If this is done we shall add to the population and to productive labor, and be able to maintain a popula-

tion of ten millions instead of two. But if this is to be accomplished, we must turn our minds in the direction of increasing rather than decreasing the labor of the farm.

What is the reason that it is so hard to obtain help on the farm? I think one reason is that the farm hand feels that he is no longer on the same social plane with the farmer, as was the case in the old days. The farmer's family to-day is more refined, and the hired man feels that he is no longer on an equality with the rest of the members of the family, and consequently is uncomfortable and out of place in the household. Farmers should allow their help to live ther own lives, and not let them feel that they are under a social handicap. Where you are unable to provide a separate house for your hired men perhaps two or three farmers could co-operate to do so.

Hon. Mr. Dryden: I think that perhaps Mr. Smith has touched on a sore spot. In the early days we had from six to nine men constantly in the house. As the family grew up this was neither convenient nor desirable. It was neither pleasant for them nor for us, and it destroyed our home life to a considerable degree. I therefore arranged for one of my men who had a wife to take a separate house and board the others. I found that the men were perfectly happy and contented under this arrangement, and that it worked splendidly.

The President: Forty years ago, in the district in which I live, the hired men were mostly farmers' sons; they were young men of ambition, and were on an equality with the farmer and his family. Now we have a class of professional hired men, and they occupy a somewhat different status. This is not the fault of the farmer, but largely the outcome of altered conditions.

Mr. Wing: At one time in Ohio we took the hired man into the house, but that time has pretty nearly gone by. To-day the farm hands are a class by themselves. At the same time, some of them save money and eventually secure farms of their own. Our wives object to waiting on the hired men, and we can't get girls. The custom is to provide them with a cottage, as Mr. Dryden has described; and we find that it is less trouble and cheaper. As to the farmer being a better man than the men he employs, I find that men like to work for a man they can look up to; but of course the farmer must not put on airs. We work our men hard, but still we find that men like to work for us. We find they are proud of working on a farm where the work is harder than anywhere else. We give them credit for it, too.

ACTUAL OBSERVATIONS OF ECONOMIC METHODS OF INCREASING THE YIELDS PER ACRE OF OUR FARM CROPS.

Discussion.

G. B. McCalla, St. Catharines, Lincoln Co.: The aim of every progressive farmer is to increase the yields of his crops at least cost. Much has been heard from the platform and press of the benefits to be derived from careful manuring, thorough tillage, and a systematic rotation of crops. Until recently, however, little emphasis has been placed on the importance of careful and systematic selection of seed. Other means to the required end are good, but the fact remains that like produces like, and without the best seed it is impossible to produce maximum crops.

This fact was forcibly impressed on my mind by my own experience this year. I contracted with a canning company to grow two acres of sweet corn, the company to furnish the seed. As they did not have the seed until planting time, there was no opportunity of testing it. Not more than ten per cent of the seed germinated, and the second sowing was too late to mature. As a contrast to this, my neighbor, who had carefully saved and cured his own sweet corn seed, had a good crop which he sold on the ground for fifty dollars per acre.

Another personal incident illustrates the value of selection of seed. Last year I obtained some tomato seed from a seed firm in the usual way. It produced a fairly good crop, but not uniform as to quality. The fruit on some vines was nearly all smooth and large, while, others growing immediately beside these had a larger proportion of rough and undersized fruit. I saved some seed from the best vines, which this year produced a noticeably good, uniform crop in what was an unusually poor tomato year. I repeated the process of selection this season, and look for better results next year. A friend, who makes a specialty of growing early tomatoes, has for several years been carrying on the process of selection of seed with a view to obtaining earlier maturing fruit. He has had marked results, and is quite enthusiastic on the subject.

While these are only indications of what can be accomplished by careful and persistent effort, they prove to my mind that a comparatively small outlay of time and careful work along this line will give greater returns than the same effort applied in any other way.

H. W. Houser, Campden, Lincoln Co.: The three chief economic methods by which the yield of farm crops may be increased are: superior cultivation, selection of seed, and cross-breeding. Important as it is, perhaps the majority of farmers have given undue attention to the first, in proportion to that given to the second method. No matter how near an ideal seed bed you may provide, if you put into it seed of poor or only ordinary quality, you cannot reasonably expect a maximum yield.

When the matter of seed selection is mentioned, too many farmers will shake their heads and say, "It is impracticable; it requires too much time and labor." While in these days, when every agriculturist is confronted by the serious "hired help" problem, there may be ample ground for this objection; still, something along this line can and should be done by every farmer. The average tiller of the soil has neither time nor, perhaps, patience to work along such thorough lines as the members of the Seed Growers' Association are already doing. These lines, of course, are the ideal in seed selection. There will be many, however, unwilling to pay a price which will make the growing of pedigreed seed remunerative. For such there is a middle course.

Every farmer can select his own seed in the field. Seldom is a field of grain uniformly good. Experiment and observation have established the fact that seed taken from that portion which is most mature at the time of cutting, which stands up best, and which in both yield and quality is the best crop, will give the most satisfactory results in following years. If not convenient to cut this portion separately, it is a comparatively easy matter to select out the best of it, and it can then be hauled in by itself and placed on top of the mow or in some place where, at the time of threshing, it can be easily reserved for the next year's seed. Then, by thorough cleaning, any one may have seed which is a great deal better than that obtained by the careless haphazard methods too generally employed. Where this plan has

been followed, both in winter wheat and Siberian oats, I have noticed a marked improvement, both in yield and quality of grain. It is easily practised where more thorough methods cannot be followed, and anyone who tries it will be amply repaid for his forethought and care.

PROF. ZAVITZ: In a series of experiments which we conducted, we found that in barley, spring wheat, winter wheat, and oats, we obtained a greater yield by 20 per cent. from large plump seed than from small plump seed, and a greater yield by about 19 per cent. from plump seed than from shrunken seed.

G. H. CLARK, Chief of Seed Division, Ottawa: Some of the farmers are now growing their own grains from selected seed. They prepare plots of from one-half to one acre, and sow thinly, by plugging every other tube of the grain drill. Unless the ground is very clean, the crop must be hoed. I know of one man, who, in this way, obtained straw from five to six feet high, and the yield was equal to the best in the neighborhood, although a large yield was not aimed at. Before harvest he selected thirty pounds of the best heads, the seed from which will be planted again next year in the same way. Any farmer who will follow that practice for a year or two will increase the yield ten per cent.

A MEMBER: We supply seed grains largely in our district. Our method is to secure good seed to start with and sow it on good clean land. We use a first-class fanning mill, and it is exceedingly beneficial in purifying and cleansing seed grains. We are unable to supply the demand although we charge good prices. My barley yielded an average of 55 bushels to the acre both last year and this.

Q.—Do I understand that you simply use a fanning mill and do not select individual plants?

A.—Yes; I use the mill twice in many cases. I think it necessary that we should occasionally procure our seed from a different locality to secure the best results.

PROF. ZAVITZ: If farmers would, in the first place, select the best variety, and then from it select the best plants and reserve them for seed, it would pay them handsomely. I have experimented with some varieties of oats, peas, barley, and potatoes for fifteen or sixteen years without changing the seed, and the yield is larger and of better quality now than it was at the start.

Q.—What about maturing grain for seed?

PROF. ZAVITZ: We have experimented for six years with winter wheat, and find that the seed that stood longest on the land and was thoroughly ripened produced a larger yield of grain and straw per acre, and the grain weighed a little more per measured bushel than that grown from seed not so thoroughly ripened.

Q.—Are not some sections better adapted to growing seed than others?

MR. CLARK: Seed of any variety should be grown on land that will bring that variety to the highest degree of perfection. Some of our land will not produce the best seed that it is possible to raise. In such cases, it is well to secure seed occasionally from other localities which produce it in a higher degree of perfection.

Q.—Is it a good plan to change seed from heavy to light land and vice versa, or will seed adapt itself to any kind of land?

A.—I find that where a change of this kind is made the result is sometimes not so good the first year thereafter as it is the second. I find that this is sometimes true of imported seed.

A.—In the Province of Quebec, it is the practice to change seed from higher to lower land. My land is mostly of the heavier kind, and some years ago I obtained seed grown on lighter soil, and it did not give good results. I get better results from selecting my seed than from changing it.

Mr. Clark: It might have been an advantage to the man with the light soil to have obtained his seed from you.

A Member: I have grown white oats for more than twenty-five years on the same farm from the same stock, and the sample is as good as any at the West York Seed Fair.

A Member: We have been growing Mandscheuri barley obtained from the Experimental Farm since 1896, and our crop last year was the best we ever raised. The year 1901 was unfavorable and we had a poor crop, but we did not change the seed, but sowed the best we had and next year the crop was excellent.

A Member: Probably a man whose soil is not well adapted to seed growing would do well to change?

Mr. Clark: I think that conclusion is correct.

Mr. Robt. Thompson, St. Catharines, Ont.: We should not rely too much on the fanning mill, but rather on selecting the best ears or heads and the best grain in those ears.

J. M. McCallum, Shakespeare, Perth Co.: In observing some of the modern methods of increasing the yield per acre of our farm crops, the splendid results from using the formalin treatment for destroying the smut spores in seed oats convince me that this method is of great economic value. When consideration is given to the facts that loose smut is a great reducer of the yield of grain, and that its presence, besides being an eye-sore to the farmer, causes much unpleasantness in handling the crop, and a decrease in the feeding value of the straw, it passes understanding why this simple and effective remedy is not more generally practised. When it is remembered that each smutted head was originally a good head of oats, and that in some fields as high as 15 per cent of all the heads are destroyed by smut, it must be apparent that the freedom from this evil is a great boon.

The treatment, which is better applied just before seeding time, is as follows: Have at your disposal a one pound bottle of formalin, a large barrel of water, and a coarse sack. Dilute the pound of formalin in about 40 gallons of water, and in this solution immerse the seed by sackfuls and leave in the solution for twenty minutes. The seed is then spread out on a clean floor to dry, and by shovelling over a number of times the drying may be hastened. In conjunction with this treatment, extra care in cleaning the grain will insure an increased yield.

As an instance of the practical profit resulting from this method, I quote an illustration which came under my personal notice. A farmer had two adjoining ten-acre fields, both having practically the same quality of soil and the same system of rotation. In one he sowed untreated Ligowa oats, and in the other, Ligowa oats treated as described above. The yield from the untreated seed was 597 bushels, and from the same weight of treated seed, 688 bushels.

Hence, we see that the splendid results more than justify the small expense of time and labor and money necessary to apply this treatment, besides giving the satisfaction of knowing that thoroughly tested and approved methods are the great economic increasers of grain yields.

F. T. Lailey, Grimsby, Lincoln Co.: The farms in parts of the Niagara District are often quite small; but whether their farms are large or small, farmers who are doing well seem wide awake to the necessity of

two things in their management of all crops, viz., thorough working of the ground, and liberal feeding of the crops.

Last spring a very careful and successful farmer sowed oats when his wheat failed, and also on spring prepared land. All were good, but where the wheat failed there seemed to be scarcely room to drive between the shocks. This man seldom gives a wrong opinion when he gives one at all, and he declared that the *extra* working the wheat land received in the fall accounted altogether for the difference. The land was all light sand. The preparation of the ground for grain and hay is most thorough, the soil being gone over again and again, until it is *just right*; while the corn, potatoes, tomatoes, and berries are cultivated about once a week.

In my ten years' of observation in this district I have seen that, other things being equal, the most successful men are those who produce and buy the most fertility. Many places are too small to carry much stock; but, even when the normal amount is kept, the tendency is to buy manure, often in large quantities. Commerical fertilizers also have their place and are used for special purposes, manure being the mainstay. To give instances; one man, with a good sized mixed farm, keeps a man and team most of the year drawing manure from town (four miles away). Another, who considers he buys a moderate amount, has fifty acres, keeps three horses, and one cow, besides pigs. He buys about two large loads a week the year round; also using quantities of fertilizers and ashes.

It seems to me that the most important improvements that could be made would be to take better care of stable manure made on the premises; and to make a more extensive use of leguminous crops grown for feeding purposes, and for plowing under as green manure.

THE PRINCIPAL FEEDS AND FODDERS AVAILABLE TO ONTARIO FARMERS.

By Prof. G. E. Day, Ontario Agricultural College, Guelph.

(Reprinted from the Union Report for 1903 as most of the copies of that report were destroyed in the big fire in Toronto.)

Everybody knows that the different parts of an animal must be built up from what enters the animal's stomach, and that in the animal's body we have different classes of materials, for instance, first, the bony skeleton; second, the muscles and the tendons, and a great many other products somewhat similar in composition, which all contain the element, nitrogen; and, third, the fats of the animal body, which contain no nitrogen.

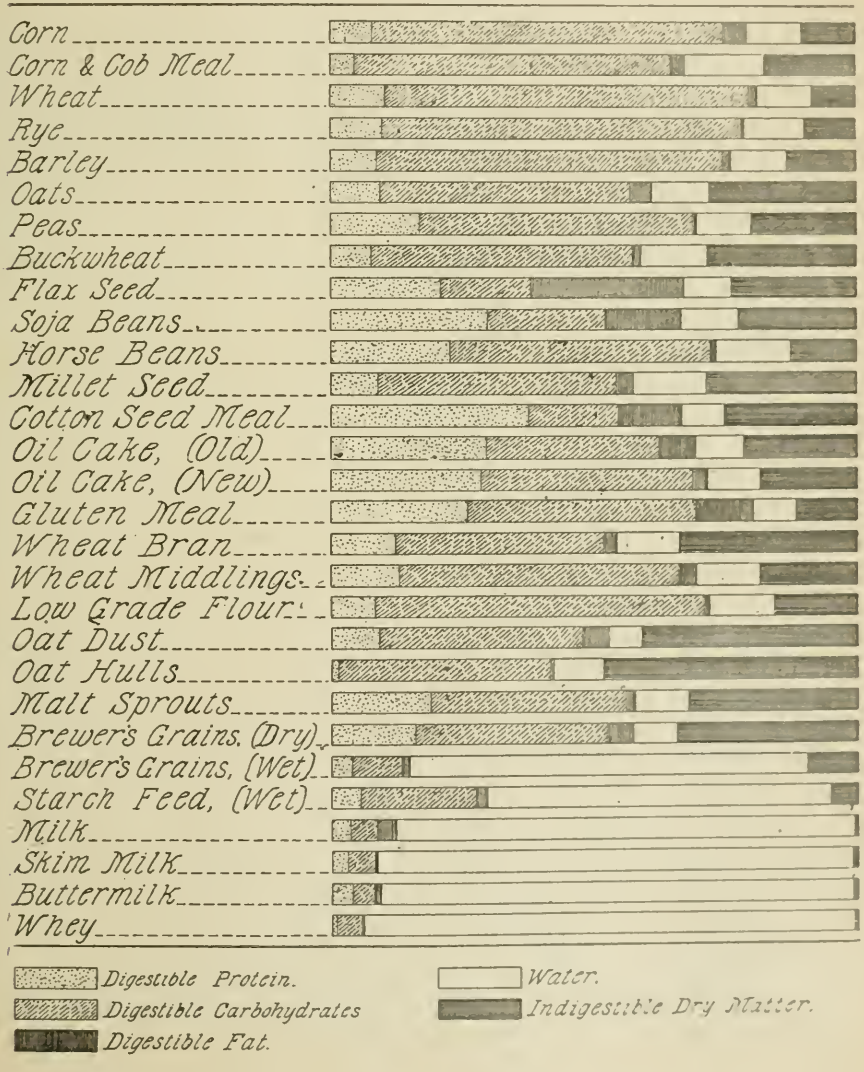
Only a part of the food the animal consumes can be utilized. A certain portion is digested and assimilated by the animal, and the remainder thrown off, and it is only that part which the animal digests and assimilates that can be of use to it, and therefore we shall deal simply with the digestible constituents of the food.

These constituents may be divided into three, or, I might say, four, main classes; first, those which go to build up the muscle, a portion of the blood, a portion of the milk, part of the hair, horn, hoofs, etc. There are a large number of these compounds, differing more or less in composition, but similar in their effects on the animal's body, and they are all grouped under the general term, protein.

Then we have another group of substances which are concerned in building up the fatty portions of the animal, and also in keeping up the heat of the body, or the energy of the animal. To this group belong such substances as starch and sugar, and many other substances somewhat similar in composition, and they are all grouped under the general term, carbohydrates.

In all foods we also have substances similar in composition to fat; flaxseed, for instance, has a high percentage. In an analysis of a food, the substances that come under this head include other substances that are not true fats. Consequently the chemist usually employs another term for these. He calls them ether extracts—but we shall simply refer to them as fat.

Table Showing Digestible Constituents Also Total Indigestible Matter and Water in 100 lbs.



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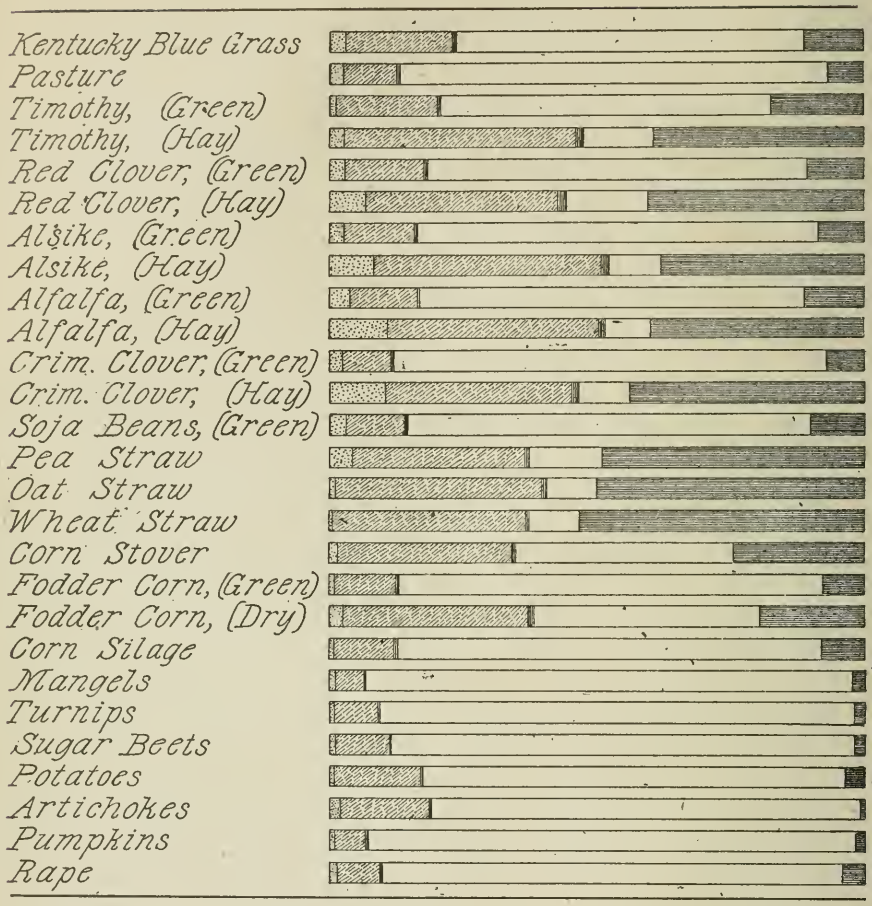

Then, we have another class of substances which comprise what is called "ash." These go to form bone.

In the accompanying chart, an attempt has been made to represent the amount of digestible protein, carbo-hydrates, and fat in a number of our leading food stuffs, and of these I have endeavored to make a fairly representative selection. I have been unable to represent the amount of ash contained in these foods on a chart of this kind, because it exists in such small quantities. We have also included the water content.

An animal requires all these constituents in order to thrive properly. Of course, it is possible to maintain some animals for a considerable time on a ration that is free from certain of these constituents, but if you took an animal and fed it on pure protein, you would soon sicken it; and the same is true of the other constituents. To do its best, an animal requires a certain amount of each. When we have a ration containing all these constituents in the most suitable proportion for a given purpose, we have what is called a "balanced ration". A great deal of time and labor have been spent in investigating what constitutes a balanced ration for different classes of animals. We have as a result certain feeding standards put forth. Thus,

the dairy cow requires per day, per thousand pounds live weight, so much protein, so much carbo-hydrates, and so much fat.

I should like to point out just here what seems to be rather an inconsistency, or a divergence of our practical experience from some of these feeding standards. The peculiarity about the dairy cow is that if you feed her a ration that is poor in protein, which is used in building up the casein in the milk, she will not give you milk that is poor in casein. She will give you milk of the same quality, or practically so, as you got from a ration rich in protein, but she will give you less milk. So that if you cut down the amount of protein in a cow's ration, if she is going to give you milk of the same quality, she must necessarily give you less of it. In the case of a dairy cow, the standard works out fairly well, but in the case of a fattening animal, there seems to be some divergence.

In certain standards the amount of protein for a fattening animal is usually stated to be about equal to what is required for a cow, but we have found in our work that a steer which is fed a comparatively small amount of protein in proportion to carbo-hydrates, has given the most economical gain.

Prof. Henry, in his book on "Feeds and Feeding," gives as an average amount of grain required for 100 lbs. of gain in the case of a fattening steer, to be 1,000 lbs. He makes this estimate from the results of experiments at experiment stations, and from the experience of practical feeders. But if you study the methods followed generally in the United States in feeding steers, you will find that they feed exceedingly heavy meal rations. In our results we have had experiments with light and heavy rations, and when feeding what we call a heavy meal ration, we find that it requires about 565 pounds of grain for 100 pounds of gain, in addition to the bulky fodder. In our light ration experiments we obtained just about as large gains (in some cases quite as large), and it required only 310 pounds of grain for 100 lbs. of gain, which is less than a third of the amount given as the average amount in the United States. The experience of nearly all our Canadian feeders at the present time, when the difference between the buying and selling price is so small, is, that they must feed a light grain ration, or one comparatively low in protein and rich in carbo-hydrates, in order to make ends meet; and our best feeders here and elsewhere are feeding a light grain ration. I simply throw this out as a suggestion, and the matter is one which will bear further investigation. I know that the most expensive feeding we have ever had about this place was done by men who followed some of the old ideas, and dealt out the grain with a liberal hand. They all got gains in weight, and pretty large gains too, but when you came to reckon it out, you found that the animal had apparently not assimilated all its food, and that the gain in weight was expensive. So I say that, taking practical results and comparing them with the standards laid down, we are led to the conclusion that there must be something wrong. It seems to me that the case of the fattening steer is different from that of the dairy cow. In the former, the main thing we want is fat. We buy a steer that is pretty well grown, and practically all he requires is to have some fat put upon him; and, in producing fat, it stands to reason that a ration rich in carbo-hydrates should produce cheaper gains than one rich in protein, because the protein of the food is much more expensive to buy than the carbo-hydrates. I am fully convinced from practical results that there is something wrong about the standard laid down for fattening steers.

Among the concentrated foods given on the chart, corn is at the head of the list of grains as a fat former, because I believe that as a single food

there is no grain that equals corn as a fat producer. In an experiment last winter where we fed blood meal with corn, we got no result from feeding blood meal. Corn is rather low in protein as compared with barley, rye, and wheat, but it is rich in carbo-hydrates. It is rather poor in ash or bone-forming material, and is therefore not a satisfactory ration to feed largely to growing animals. Something else is required to supply the muscle and bone forming materials.

Corn and cob meal is naturally a little lower in digestible matter, but the ground cob mixed with the corn has given satisfactory results in feeding. In many experiments it has given as good results as the pure corn meal. The explanation is this: the pure meal is of a heavy, close nature, and is a little more difficult to digest than when it is mixed with the more bulky material of the ground cob. In any case, I think a food like corn should be lightened up with something such as oats or bran, to overcome that objectionable feature.

In all cereal grains there is a similarity of composition. Oats are rather low in carbo-hydrates, due to the fact that the hull contains much woody fibre. The amount of fat is comparatively high, higher than in wheat, rye, or barley. Rye comes between wheat and barley in feeding value: it is a little lower in carbo-hydrates, protein and fat than wheat, but a little higher in these constituents than barley.

Peas are rich in protein and also fairly rich in carbo-hydrates. A good many are surprised at the small amount of fat in peas, and think there must be something wrong in the analysis. You can easily see the reason for it: it is not the fat alone that is concerned in fat production, but the carbo-hydrates also produce fats, and so does protein.

Pasture grass is very nearly a balanced ration for a dairy cow.

Flax seed is a food that is badly out of balance. If you compare it with cotton seed meal and oil cake, you will see that in all of them there is too much protein and fat, and too little carbo-hydrates. Consequently we have here suitable foods to mix with foods poor in protein. That is the reason why cotton seed meal is so valued by dairymen—because it brings up the protein content when mixed with ensilage, etc. It is a good food to combine with one that is poor in protein.

Gluten meal is, also rich in protein and fat. The term gluten meal is rather loosely employed. Gluten meal is a by-product from starch factories, but we have a by-product from those factories which is not true gluten meal. The true meal has all the bran of the corn removed, but the gluten meal from some of our factories contains the whole of the by-product from the corn, and should preferably be called gluten feed. It is a valuable food, but not so valuable as gluten meal.

As a food to balance the ration of a dairy cow and increase the protein, bran is better than middlings, but for pigs, middlings forms a much more valuable food.

Oat hulls are rather poor in digestible matter, but oat dust compares favorably with bran in this respect. The trouble with these products is to determine what they really contain. Take oat dust; you never know how many hulls you are getting mixed with it; it will vary so much with different mills.

Q.—Is oat dust ordinarily known as black dust ?

Prof. Day: Yes; I believe so.

Q. We have on the market a white dust and a black dust; the white seems to be a meal.

PROF. DAY: I have been unable to find any table giving digestible constituents of white oat dust.

Q.—There is a difference in the market price, the black dust being $10 per ton, while the white is often over $20.

MR. GRAHAM: We use white dust in the poultry department, costing about $1.30 per hundred.

PROF. DAY: As regards malt sprouts, the complaint is that it is not a very palatable food, and only a small amount can be used, otherwise it is a valuable food in balancing a ration.

Brewers' grains, dry, are also rich in digestible matter. The wet grains have a large proportion of protein to carbo-hydrates, but also a large amount of water, and I assume that the reason they have given such good results in milk production is due to the fact that, where fed in considerable quantities, they help to balance the ration, as they contain so much protein in proportion to carbo-hydrates. One difficulty with them is that they tend to ferment in the mangers, and therefore cause an unsanitary condition in the stable.

The Soy bean is exceedingly rich in protein, about the same as oil cake, and richer in fat than oil cake. It is a very concentrated, rich food, and where it can be grown advantageously, would be a most valuable food in balancing a ration.

As regards the bulky foods, you will observe that fodder corn dried in the field is very similar in protein content to timothy hay, and is somewhat similar in general composition.

Oat straw has a considerably higher feeding value than wheat straw. Barley straw comes between the two. Pea straw of good quality is rich in protein, and contains more digestible matter than oat straw.

Mangels, turnips, and sugar beets are practically the same in protein content. In feeding dairy cows, in two experiments here, we got just as good results from mangels as from sugar beets, but for fattening purposes we should expect better results from sugar beets, as they contain more carbo-hydrates. While the chart shows turnips to contain more dry matter than mangels, I may say that this is very variable, depending very much on the season.

Artichokes are higher in feeding value than potatoes, and Mr. Brethour, whom I see is present, has had excellent results from them as a food for hogs. Pumpkins have about the same protein content as turnips and mangels, and are of somewhat similar feeding value.

Rape, compared with green clover and blue grass, contains more water. The total amount of food it produces per acre is very considerable.

If you compare Kentucky blue grass with the ordinary mixed grasses, you will see why it is so highly esteemed for fattening cattle where cattle are fattened on pastures—because it contains a higher percentage of digestible matter for a green food.

Last year in our experiments we used tankage and blood meal. Our Canadian houses sell these products as fertilizers, but they are not prepared for feeding purposes. That which we obtained from Swift & Co., of Chicago, had been put through a special process to purify it, and hogs are very fond of it. As you will see, it has a very high food value, and I think it is a pity that our packers sell this material for fertilizing purposes.

We conducted several experiments with blood meal and tankage in feeding hogs. One lot of hogs fed on blood meal, barley, and middlings, the blood meal being valued at $45 per ton, and the grain at $20, made gains at a cost of $4.16 per hundred pounds. Another lot was fed tankage

(valued at $30 per ton), with grain, and made 100 pounds of gain, at a cost of $4.24. A second lot fed the same ration made gains in weight at a cost of $4.05 per hundredweight. In comparison with this, we fed two lots of hogs grain and skim milk, the latter being valued at 10 cents per hundredweight. These lots cost $5.40 and $4.78 respectively for one hundred pounds of gain.

I think these are most valuable foods for young pigs, especially where skim milk is not available, and we intend to conduct further experiments in this direction.

Q.—Have you not placed a low value on skim milk ?

Prof. Day: Yes, I wanted to give it a low valuation, but even when valuing it at only ten cents per cwt., the cost of gain ran a good deal higher than in the other groups.

Q.—Was it a summer experiment ?

Prof. Day: Yes; and the packer's report stated that all the pigs were first-class as regards firmness. They had been fed a little green food, grass, etc., every day, by way of variety, but not enough to count in the results.

J. H. Grisdale, B.S.A., Central Experimental Farm, Ottawa: Alfalfa is a crop that is being neglected somewhat in this country. It may be grown almost anywhere in Ontario, and in many parts of the other Provinces. We have grown it successfully at Ottawa, and it has given excellent results as a food for cattle, sheep, and swine. The trouble in the past has been to get a good catch. That may be overcome by careful seeding and preparation of the land beforehand. One must not think that because it is one of the clovers, it may be grown in any kind of a field without proper preparation. On the contrary, it requires very careful preparation. Once it has been made to catch, it will stand for some time, and leave the soil in much better condition.

Prof. Day did not refer to the value of sugar beets in feeding hogs. They are of great value for that purpose. They must be fed judiciously, however, or they may cause soft bacon. In our experiments we have had exceptionally good results with them.

No food we have used for hogs has given such good results as rape. I think it should be fed more extensively, than at present; and fed to different classes of cattle. For beef production, or for young cattle, it cannot be surpassed, especially in the fall, when it may be grown to great advantage, as it may be sown upon stubble after the grain is harvested, and will yield a good crop under fair climatic conditions, furnishing pasture in the latter part of September and all through October and November. There is no food that will pay better for the money and the trouble it takes to cultivate it, than rape. For milk production the same thing applies. I do not want to recommend it too strongly for use with dairy cows, but a few farmers in our district have been using it for that purpose, and declare that they have never fed any forage plant that could compare with it as an economical milk producer. I have found that turnips have given better results in milk production than mangels, but there is a danger of their giving an objectionable flavor to the milk.

Prof. W. J. Spillman: Any of the ordinary crops which affect milk may be fed with impunity if they are fed to the cow immediately after you get through milking; but you must not feed them within eight hours previous to milking. If turnips are fed within a few hours of milking, they will flavor the milk, but you can feed all the turnips you want to if you feed immediately after milking.

MR. GRISDALE: Dried sugar beet pulp is a product which is now being placed upon the market in this country, and demands attention. It contains a high per cent. of dry matter, and to it is added about forty per cent. of dry molasses. It makes a very palatable food, and seems to agree with the cattle and has a good effect on their appetites and digestive organs. We have been able to feed eight pounds per day without any injurious effects. It costs $10 to$12 per ton. Molasses is also fed in liquid form, but one has to be careful not to feed too much.

In the concentrated foods, Prof. Day mentioned gluten meal and gluten feed, and pointed out how much these foods varied in their constituents. In Eastern Canada we have the real gluten meal. The average gluten food from Ontario tests only 34 to 36 per cent. protein, and contains the hulls, or the bran, and the sweepings. We have fed gluten meal very extensively, and I may say that I think it should be used more extensively, only I am afraid that if so used the price would likely be raised. A few years ago it could be purchased at $10 per ton—to-day it is $25.

This raises a point that is worth discussion, and that is the importance of knowing exactly the contents of these by-products, such as gluten meal, oat dust, oat hulls, etc. Each manufacturer of these by-products should be required by the Government to place upon the sacks containing the foods, an analysis of the contents, just as is required in the case of plant foods, which we never think of buying without knowing what they contain. It would cost a little, but the cost would be as nothing in comparison with the good that would result from being able to select that food which is most easily digested and is the richest in the elements of animal food.

Q.—How does corn bran compare with wheat bran?

MR. GRISDALE: It is not nearly so rich in protein or in carbo-hydrates.

PROF. DAY: In the case of the blood meal and tankage, I forgot to mention that it is guaranteed to contain 60 per cent. protein for tankage and 87 per cent. protein for blood meal, so that the purchaser knows exactly what it contains.

PROF. W. J. SPILLMAN: I wish to emphasize one point the last speaker made, and that is as to the importance of alfalfa. It is a new crop in this section and in the Eastern States, but it has always been the leading hay crop in the Western States. There were 2,000,000 acres of alfalfa grown in 1890. Since then the area has been much increased, and in the Eastern States we have begun to think that it is the most important hay crop we can grow. I am not surprised to learn that you can grow it here, because it grows readily in Michigan and Wisconsin, which are farther north. In Onondaga County, N.Y., alfalfa has been the standard hay crop for fifty years.

As to the best ways of utilizing that crop, I may say that it is essentially a hay crop. It will give three crops a year, and when once well established on land fairly free from weed seeds, it is good for a long time, unless you should happen to have a very unusual winter to kill it out. There is a field in Onondaga which is said to have been sown 42 years ago, and still has a pretty fair stand of alfalfa. In no way will it yield a larger return than as a pasture for hogs. A great many of the farmers in our country are doing this, and are making very large returns. I know one who kept ten head of hogs to the acre of alfalfa, and they were not able to keep it down, and he cut it for hay once, and got a ton to the acre. It is possible to grow good large hogs on alfalfa without any other food, but the best results have been obtained from feeding a small amount of some other food

along with it, such as corn. I would feed about two ears per day to hogs pastured on alfalfa. In our country we can produce hogs at less than three cents live weight on alfalfa and corn.

I want to urge the importance of another point suggested, and that is of having some way of knowing the composition of these meal products. Every year they become more and more important as feeding stuffs, for the reason that manufacture is on the increase, and these by-products are becoming more plentiful and more numerous in variety. Almost every year sees a new kind put upon the market. They vary a great deal. Some millers in our country, and I assume it is the same here, add the bran and the dust from the floor sweepings, saying that dust is one of the by-products. A number of our State Governments require that these products be guaranteed; that is, there must be placed on every package a tag showing the composition, which they guarantee. It is an excellent law, and might well, I think, be adopted here.

W. P. Gamble, B.S.A.: In analyzing these by-products we have found that they vary very widely in composition. We obtained a sample of oat dust from a mill, and found it contained 8.12 per cent. protein and .37 per cent. fat. A year later we took a second sample from the same mill, and found it contained 12 per cent. protein and 2.99 per cent. fat. The same variation occurrs in the case of oat hulls, gluten meal, and other products of a similar nature.

Many stock foods contain high percentages of ash, which is largely the potassium salts, which are not valuable constituents and are hard on the excretory organs, and it is therefore not desirable to feed such foods to any great extent.

Mr. de Coriolis: Reference has been made to sugar beet pulp. This pulp used to go out from the factory containing 90 per cent water, and with such a large amount of water, the cost of transportation was too high in proportion to the value of the feed. This year, however, one factory has installed a drying plant, which has reduced the moisture to three per cent. The composition of the pulp is then as follows:

Water	3.17 per cent.	Protein.....	7.68 per cent.
Fat	.72 " "	Ash	6.03 " "
Fibre.....	...20.67 " "	Carbo-hydrates	61.73 " "

It is rather high in fibre and low in ether extract, and the manufacturers thought of improving it by having the pulp absorb crude molasses. It then has the following composition:

Water	2.70 per cent.	Protein	8.81 per cent.
Fat	1.46 " "	Ash	6.34 " "
Fibre.....	.14.11 " "	Carbo-hydrates	66.58 " "

This is a great improvement. The reason I bring this to the attention of the meeting is that there is a large amount of this pulp being produced. There are four sugar factories working in Ontario, which, combined, will use 100,000 tons of beets each season, and half of that amount will go out as pulp with ninety per cent. of moisture. If all this pulp were dried, the output would still be very large, and would have to find a market, and it is important to know its composition and its value as a cattle food.

We have not made any experiments as yet as to the digestibility of this food, and it will be necessary for us to do so before we can make any definite statement as to its value.

PROF. W. J. SPILLMAN: I am very greatly interested in what I have learned about pulp. It has been fed extensively in our country, and with great satisfaction. Unfortunately, our factory men have refused to put in drying plants, with one exception in Michigan, and most of the feeding has been done with wet pulp. I hope all your factories will put in driers. There will be no difficulty in disposing of the pulp if it is dried and molasses added to it, provided it is advertised.

MR. J. E. BRETHOUR: In reference to artichokes as pig food, I have given this matter some attention, and am pleased to say that this root forms a very desirable vegetable food for hogs. It is a richer food than the potato, and gives better results. One great advantage with this crop is that it may be planted at a leisure season in the fall. It will then come up early in the spring, and can be fed the following fall. What roots are left in the fall will not spoil, but may be fed in the spring. There is therefore no trouble with storage, which entails a great deal of work. They are also valuable in keeping animals healthy, as they get exercise in searching for the roots. Some grain food should be fed in conjunction with them. The system of growing is similar to growing potatoes. They are planted in drills fourteen to eighteen inches apart, and cultivated on the flat. If they are not fed too closely, it is not necessary to plant a second time. The second season we plow the ground and work it on top, then leave it till the roots sprout, and as soon as we can see them in the field, we cultivate them out in rows. It is an economical way of furnishing a bulky food. I am informed by people who have tested them that they will yield from one thousand to twelve hundred bushels per acre, and, if that is the case, I am sure there is no more valuable food.

Q.—What sort do you use?

MR. BRETHOUR: The white artichoke.

Q.—What time in the fall do you plant?

MR. BRETHOUR: Any time after October, so as to remove any danger of sprouting, and cultivate the first thing in the spring.

Q.—How much seed to the acre?

MR. BRETHOUR: About 25 bushels.

Q.—Do you cut them?

MR. BRETHOUR: No; we have never gone to that trouble.

Q.—Where can you secure the seed?

MR. BRETHOUR: I secured mine from a man who was growing them near me.

PROF. SPILLMAN: With reference to alfalfa, it is very dangerous to pasture cattle or sheep upon alfalfa alone, as they are subject to bloat. Sometimes cattle will refuse to eat it at first, but they soon get used to it.

PROF. ZAVITZ: I have known two or three instances in Ontario where cattle died from pasturing on alfalfa alone, but where it was sown with a mixture of grasses I have not known of such cases.

PROF. SPILLMAN: Some farmers in Ohio sow it with brome grass and clover. It is an excellent mixture, and with it the danger of bloating is extremely small. If wheat straw stacks are available, the danger is reduced to nothing, as the cattle will eat the alfalfa for two or three hours and then eat the straw.

PROF. GRISDALE: We are growing it pure and mixed, and I think it is quite possible to grow it profitably in a rotation where there is only two years in hay. The crop is very much greater than we cloud get from the common red clover, so much so that it more than pays for extra cost of seed.

ANALYSES OF BY-PRODUCTS.

Reported by the Secretary.

At the last annual meeting of the Experimental Union it was moved by Mr. Henry Glendinning, seconded by Mr. T. G. Raynor, and carried:

"That this Experimental Union memorialize the Dominion Government to enact a law that the manufacturers of all by-products used as feeding stuffs for live stock, such as bran, oil cake, gluten meal, etc., be compelled to place upon the package the analysis of the same, showing the protein, carbohydrates, and ether extract the food contains, and that the same be guaranteed."

On February 5th a letter was sent to the Hon. Sidney Fisher, Dominion Minister of Agriculture, along with a copy of the resolution passed at the meeting. On February 8th the Minister replied, stating that the resolution would receive his most careful consideration. At a later date, the Minister of Agriculture again replied, stating that the law suggested would have to be passed by the Minister of Inland Revenue, and that he (the Hon. Mr. Fisher) would discuss the matter with the Minister of Inland Revenue, and urge the introduction of a bill during the coming session.

Discussion. It was the feeling of the meeting that this resolution was too comprehensive to be workable, owing to the fact that it included common mill feed, such as bran and shorts. It was moved by Nelson Monteith, seconded by Prof. Day, and carried, "That the President be authorized to name a committee to consider the resolution, and make a recommendation to the meeting regarding it." The President named the following a committee for that purpose: W. P. Gamble, N. Monteith, and T. H. Mason.

The committee appointed to consider a resolution *re* the sale of feeding stuffs, beg to recommend that the Government be requested to establish a standard of quality to regulate the sale of the by-products of mills, and all commercial feeding stuffs.

W. P. Gamble,
Nelson Monteith,
T. H. Mason,
Committee.

SELECTION OF SEED CORN.

By Jos. E. Wing, Mechanicsburg, Ohio.

Corn is a subject of great interest all over the United States just now because we have been getting good prices for it. All our corn land has now been plowed, whereas all the wheat land has not. There is a little corn land in Argentina; but I do not believe they will grow very much corn there; there is too much work about it. Therefore, I think we may feel sure that corn will remain a good price in the future, and we all know that for a fattening food there is nothing quite so good as corn.

It seems presumptuous for me to come here and talk on seed corn; yet, there are some general principles that hold true the world over. When you want to improve your type of corn, do not send to me for seed. Do not move corn very far north or very far south if you want the best results; keep it along in the same latitude. It is a strange fact, however, that corn has a remarkable way of adapting itself to conditions and climate. In a new

locality a variety will probably do better the second year than the first, and better still the third year; and after a while it will become a different corn altogether.

I assume that some of you in this Province are obliged to grow flint corn; but I feel sure that in some sections of Ontario you can grow the dent, and that is much to be preferred for fattening animals.

Seed corn should be selected while it is on the stalk. When I walk through the field looking for seed corn, and find a stalk with half a dozen ears on it, I pass it by, because I do not want to pay a man to husk out small corn; I would rather have it all in one ear. I select corn that grows on a medium sized stalk. I pass by the giant stalks, and select a stocky, solidly built one. Then I pull it down and look at the ear, and if it is favorable, I select it. If it is not really hard I do not mind. I dry it well, and it will germinate all right. Corn that is dried thoroughly and kept dry during the cold weather will germinate better than that which is allowed to remain on the stalk longer and to get chilled before it is thoroughly dry. I dry my corn for seed on racks in the basement near the furnace. Some of our seed corn growers have an idea that corn ought not to freeze at all, but I do not think it matters if it is really dry.

Regarding type, I like the ear to be pretty nearly the same in circumference all the way up; then the corn will be pretty much alike. I like a cob of fairly good size.

There should be good depth of kernel. I do not like a corn that is smooth and round at the end of the kernel, but prefer one that is rough to the touch, as that is an indication of length of grain.

It makes no difference what part of the cob you plant, although some people have an idea that corn from the small end of the cob should not be planted.

T. H. Mason: Mr. Wing's views are borne out by my own experience. In this Province we are becoming more and more interested in corn growing. The question of securing good seed corn is a very important one to our farmers. Much of the seed imported to this country in the past has come from districts where the climatic conditions are different, and it was often not selected corn at all, but was simply purchased at the elevators.

Whether we grow corn for grain or fodder, one essential that I would insist upon is that we select a variety that is sure to mature in an ordinary season. It may be necessary for us to experiment a little on our own account to ascertain this, and it is wise for any young corn grower to study the report of the Experimental Union.

Having a variety that will mature in our locality, the next thing is to grow your own seed. We shall never make progress while we continue to buy seed indiscriminately. I do not think there is any grain plant that responds so quickly and surely to selection as corn; you may improve its characteristics very materially in a few years.

Perhaps the best way to select your seed is to go through the field at the time of ripening, and select the earliest ripening and best shaped ears. If you have an old fashioned kitchen, there is no better place to dry seed corn, and this should be done before the heavy freezing weather begins. Where this is properly done you need have no fear of the winter cold, no matter how severe. Any one who will follow this plan will get stronger and better plants, and better results in every way than from the majority of the seed corn on the market.

I should like to ask Mr. Wing why he prefers dent to flint for fattening purposes; we have an idea that the flint is better?

MR. WING: Do you grind it?

A.—Yes.

MR. WING: We are too lazy to grind.

Regarding corn for the silo, do not make the mistake of growing the Mammoth kind. We grow corn for the silo that matures a good ear. I want that ear almost as mature for the silo as for the crib; and the stalk should have some juice in it. Do not send to the United States for seed corn, unless you send to Minnesota. If you get brother Hayes to supply you with some of his special dent corn—I think it is No. 16—I do not think you will find a better variety for this climate. If you send to an ordinary seed house, you will be grievously disappointed. We do not dare do that. When we get new corn, we secure it from a responsible grower in the same latitude, and even then it is often disappointing the first year.

MR. CLARK: Good vitality in seed corn is very important. Last spring we collected about 130 samples upon the market, and considered we were getting an extra good sample if 70 per cent. germinated. I would not like to offer an opinion as to whether extreme cold will injure the germ or not. I should prefer not to expose it to excessively low temperature.

J. O. DUKE, Ruthven: In Essex, the growers take considerable pains in the selection of their seed, and more are doing it this year than ever before. The first essential is to select a locality where the corn is thoroughly ripened. That will be found on the north shore of Lake Erie. If the corn is not thoroughly ripened, unless great care is taken in the curing, probably ninety per cent. will not germinate. Farmers who cannot grow their own seed corn should purchase it in the ear.

W. C. GOOD, Brantford, Brant Co.: In the selection of seed corn I am firmly convinced that there is much for Canadian farmers to do. There is much that the average farmer can do, if he will, and there is also much that can only be suitably done at a Government Experiment Station.

I take it that there is no limit to the kind or degree of change that may be wrought in any living organism by a continuous process of selection. At any rate, the wonderful results of selection, both natural and artificial, warn one not to set limits, though there may be such, from a theoretical point of view. Consequently, we may usually assume that any improvement we desire in any plant or animal may be realized through intelligent and patient study and effort.

Indian corn is becoming one of our principal crops, and already it has been modified very much, indeed, by artificial selection. The increasing of the percentage of protein in corn is a problem which has already been solved, to a great extent, by some of our neighbors to the south and west, and there seems no reason to believe that the improvement in this particular, and in others, that has been taking place will not continue during the years that are to come. The average farmer however, cannot set about such a matter as improving the qualty of the maize kernel, because he has no facilities for chemical analysis; but he can do a great deal to improve the corn plant in general quality. The number and size of the ears, earliness in maturity, general thriftiness and strength of stalk,—all these are under the control of the average farmer, and it seems worth while, even in a busy season, to do something towards selecting good seed.

This year I had two kinds of ensilage corn—Early Leaming and Wisconsin Earliest. Just before cutting, about September 20th, I selected a number of the best stalks, with good, fairly well matured ears, and shocked them up along one end of the field. Later, after the stalks had become dry, I husked this corn. Most of it I found hardly ripe. Some of the ears,

however, were excellent, both in maturity and in general quality, and these I have gathered out and am now drying in a bag hung up to the ceiling of the back kitchen. I purpose sowing this next year, in addition to some that I shall purchase, and selecting from the next generation. The improvement in one generation may be considerable, but, if I can improve the earliness of maturity alone, I shall consider my labor well spent. The Wisconsin Earliest I find slightly earlier than the Leaming. Otherwise, the two kinds are much alike in general appearance and yield.

SEED CONTROL BILL.

At the twenty-fifth annual meeting of the Ontario Agricultural and Experimental Union, it was moved by Mr. T. H. Mason, and seconded by Mr. W. B. Roberts, and passed: "That we, the members of this, the Ontario Agricultural and Experimental Union, hereby express our approval of the principles embodied in the bill respecting the 'Inspection and Sale of Seeds,' that was recently introduced into Parliament, and ask the Honorable, the Minister of Agriculture for Canada, to urge upon Parliament, without unnecessary delay, the necessity for the adoption and application of those principles which we believe will materially serve to protect the farmers of this Province from evils connected with the commerce in agricultural seeds."

G. H. Clark, Chief of Seed Division, Ottawa: The resolution passed last year by the Union was forwarded to the Minister of Agriculture by the Secretary. Unfortunately, owing to the pressure of work in the House of Commons, the Minister was unable to get the bill through, and it was laid over for another session. I know that it is his intention to bring it before Parliament again this session, and my expectation is that it will become law by the 1st of July.

THE SHIPPING OF FRUIT IN COLD STORAGE.

By Prof. J. B. Reynolds, O. A. C., Guelph.

A report on these experiments will be found in O. A. C. Bulletin No. 139, published by the Ontario Department of Agriculture, Toronto.

DEFECTS IN THE WOODLOT AND HOW THEY MAY BE REMEDIED.

By Dr. J. F. Clark, Toronto.

When the question of improving the woodlot is raised, the first question the farmer asks is, "Is it worth while? will it pay?" The best answer to this is found in the fact that every year the price of fencing material and other wood supplies required by the farmer increases, and the available supplies of merchantable timber decreases. The last few years have also witnessed an awakening in regard to the value of the farmer's woodlot as a source of fuel. In many parts of Ontario the people have learned that, in the event of a snow blockade or a coal strike, the local supply of wood fuel is the only thing which stands between them and actual suffering.

As regards the financial aspect of the question, I may say that, despite the increased use of cement and steel in the construction of buildings, wood is used to a much larger extent today than ever before. This is due largely to the marvelous industrial development that has taken place. Almost everything that is produced under our diversified form of industry requires wood for its production and is packed in wood for shipment to the point of consumption. We, in Ontario, are already very largely dependent for our hardwood supplies on importations from the United States, and the hardwood supplies of that country are being depleted at an alarming rate.

It is a common error to suppose that results of caring for the woodlot are so long in coming that it is almost hopeless for anyone to reap the reward of better methods in an ordinary life time. Such is not the case. It is often possible, with a change to better methods, to increase the annual net production of wood on an acre of woodlot from one-fifth to one-third of a cord to fully two-thirds or three-fourths of a cord, or even more in five or six years. Where there is no woodlot and a plantation must be made, the time required for returns is naturally longer; but even here it is possible for farmers to receive a cash return in from eight to twenty years, according to the needs of their local market and the practicability of using fast growing species.

Aside from its value as a producer of fuel, of saw timber, and of fencing stock, the woodlot may, if wisely located, prove of the utmost value as a windbreak for field and orchard crops and for the home. In the case of crops, its value will be greatest in conserving the moisture of the soil by breaking the sweep of the drying winds, and by preventing damage by mechanical injury or by winter-killing frost. The greatest value of the windbreak for the barns, the barnyard, and the home, will be found in a lessened demand for food by the stock and fuel for the house, and the greater comfort experienced by man and beast in moving about the barnyard during the winter months.

I have been asked to speak about defects in the woodlot and how to remedy them.

The defects are of two classes, (1) those affecting the character of the stand, and (2) those affecting the vigor of growth. The character of the stand is determined by the character of the cutting. Ninety per cent. of our farmers practise a selective system of cutting, by which they select the good trees and leave the poor ones, because the former are easier to saw and to split. The results are disastrous to the woodlot. Imagine a farmer selecting his best stock for slaughter and keeping the halt and the lame for breeding purposes; yet, that is the course purused almost universally in the woodlot. The remedy for this is obvious; reverse the policy, and take out only the inferior trees. First, take out inferior trees that are interfering with the growth of the better varieties. If an inferior tree is overtopping a superior one, it should be at once removed. That is the very first step towards improvement. After that, remove defective trees; that is, trees that are leaning, crooked, hollow, or fire-scarred. The next class of trees to come out are those that are inferior in form. A crooked tree will make as good fire wood as a straight one, but it will make nothing else. The ideal woodlot should produce valuable timber, and only the tops and branches and thinnings should be used for fuel.

Another mistake in relation to the character of the stand is found in over-cutting. I have known farmers to cut out all the inferior trees, and leave only the finest and nicest; but they did not leave enough. They were so far apart that the lower branches developed at the expense of the top.

Some dry summer the tops died. They said it was a dry season, but it was not. The trees had been thinned too much. The light had been allowed to reach the soil, permitting weeds to grow and lessening the humus and the moisture holding capacity. Moisture is extremely important, and leaves on the ground will give all the fertilizer that is needed. If the woodlot has been over-thinned, the remedy is to fill in by planting seedling trees.

The third defect I shall mention as affecting the character of the stand arises from grazing. Grazing should never be allowed. Sheep or horses cause more damage than cattle. By allowing grazing, the young trees are destroyed, and grass and weeds, which use up much more moisture than the young saplings, occupy the ground. By the removal of the undergrowth, the wind is allowed free sweep, and thus drives away the leaves which provide humus, and dries out the soil. The remedy is to shut out the stock.

Where the woodlot has suffered to a serious extent from a combination of these causes, the only remedy is to cut it as you need the wood, and plant the area cut with the species you want.

The defects that relate to the vigor of growth are (1) lack of good soil cover, and (2) access of wind to the soil. A lot that is kept in good condition may grow at the rate of 100 to 120 cubic feet or even more per acre per year, while if abused and neglected the production may be easily reduced to half or even one-fourth this amount. With a good soil covering, such as is found in the natural forest, a good seed bed is provided for the young trees, and a strong undergrowth will result. This prevents the winds from sweeping through the lot and the sunlight from striking the soil, and ideal conditions are maintained for conserving soil moisture. You may walk in the natural woods without feeling the least air motion, but in the middle of most woodlots you may have your hat blown off on any stormy day. As a consequence, the leaves, instead of forming humus, are blown away; the soil is dried out, and the trees grow slowly and often die at the tops. As a remedy for this, leave the trees on the margins of the lot as close together as possible, or plant evergreen trees as windbreaks. Not only does live stock destroy the young growth, but it compacts the surface and injures the seed bed. This compacting of the surface soil causes the water to run off the surface after heavy rains. Consequently, in a dry season, when such rain as falls is usually in the form of thunder showers, the benefit so urgently needed is lost to a very great extent.

Geo. S. Henry, Lansing, York Co.: Of all industries yet encouraged in this Province, forestry is perhaps the slowest in giving financial returns. Of no form of husbandry can it be more truly said, "One soweth and another reapeth." At first sight, forestry does not appear very attractive to farmers in general; its profits are too remote.

However, on closer study, it may be found more suited to our wants than we, at first, imagine. Trees may be planted on the waste and unproductive parts of the farm, thereby making use of that which is now a loss. It is year by year becoming more apparent that the clearing of all the land is a detriment to agriculture in all its branches. The re-planting of the waste land, and even small belts of the cultivated fields, will, to a very considerable extent, counteract this evil. Besides, the initial cost will not be great, and the cost of maintenance will likely be small. Again, a farm, to sell for a high price, must be well improved, and it will soon be recognized that a young plantation has its place among modern improvements. And it will be found that good trees soon grow to have a commercial value.

With considerable areas growing good trees, it will, doubtless, prove a valuable asset for the Province as a whole; all classes will benefit through the supply of good timber. This is for the future, and encouragement should

come from the representatives of the people generally. We, therefore, look to the Government to direct the farmers in this new branch of husbandry. It is for the Government to guide us in the choice of trees, the preparation and cultivation of the ground, and all that pertains to its successful undertaking. And then, in time to come, we shall have valuable forests to supply the markets, which, even now, are showing signs of depletion.

C. H. Shuh, Waterloo Co.: The farmers' woodlot, which, for so many years has been so sadly neglected, is now also destined to receive its share of attention. The forests have been cut down without any thought of replenishing them, until to-day, on many farms in Old Ontario, there is hardly any land devoted to the wood crop. Such a condition of affairs should receive prompt attention at the hands of the Legislature, as there is also an ever increasing demand for lumber. On farms where there is still a fair sized woodlot, it can easily be kept so as to produce a paying crop. The first main thing is to keep the cattle out. If allowed to pasture in the bush, they eat the leaves off the seedlings, and also break them down and trample the ground so much that the young growth can make no headway. Where no woodlot exists, it would be advisable to plant the waste places with forest trees.

I understand that a forest nursery was started at the Ontario Agricultural College last spring, and in a few years seedlings will be distributed among the farmers. In connection with the nursery, a School of Forestry should also be established at the O. A. C. The very nature of the course at the College leads right up to the work of the forester, and a School of Forestry located at that place would be exceedingly appropriate. We, as farmers, would like very much to see a School of Forestry in connection with the Agricultural College.

N. Monteith: Coming as I do from the western part of Ontario where only ten per cent. of the country is in forest, I can well appreciate the truth of what Dr. Clark has said. One of the benefits which we should derive from more extensive tree planting would be the checking of the high winds that sweep across the higher lands in the western peninsula. But the fact that there is so little rough land there makes it difficult to induce farmers to plant wood lots. Still, I think that much might be done in planting along the river valleys. It is a great pity that the hill sides along river valleys have been denuded of their forest growth, and if something could be done to reafforest such lands, it would be a great benefit. The nursery for forest trees that has been established here will fill, to some extent, an existing need. One of the difficulties experienced in planting such land as I have described is to get the trees successfully started. The land has become grassed over and it is difficult to induce forest conditions. I planted a ravine with evergreen and broad-leaf trees with some success, and believe that in a few years these adverse conditions will be overcome.

In planting along fences and roadways, we find that the telegraph and telephone companies are no respecters of shade trees, and do much damage. For this purpose we find that the hard maple is the most satisfactory tree to plant. We find it advantageous to plant the rows running north and south, as if planted east and west, the shade is injurious to growing crops. Elms and soft maples, and trees that are not deep-rooted, destroy the crops for a greater distance than deep-rooted varieties.

The President: Can we do anything to supply fuel by planting windbreaks and rows of trees? Many will do that where they will not reafforest.

Dr. Clark: Trees planted in windbreaks will make as good firewood as when planted in the wood lot; but they will not supply clear timber, be-

cause in a windbreak they require to have as many branches as possible, and those branches close to the ground. This means knotty wood.

A Member: It does not seem to me that it is practicable for a farmer to produce sufficient from his wood lot to supply his own fuel. You have stated that 150 cubic feet is a good growth per acre for one year. Allowing thirty cords to the house, it would take seventeen acres to produce that amount. On good land you would get a sufficiently greater return from cropping to purchase your fuel. I think that the question resolves itself into one of taking care of the wood lots that exist on our farms at the present time. At present the wood lot is the most neglected spot on the farm, whereas if it were taken care of, and a few trees planted, it would yield something.

Q. What is the best means of starting trees on grass-covered land?

Dr. Clark: Wherever it is possible to cultivate the land, by all means cultivate it, and prepare it as thoroughly as for any other crop. Where this cannot be done, remove from eighteen to twenty inches of sod, plant the tree, invert the sod and place it around the tree as a mulch. If you plant closely enough, and plant trees like white pine and hard maple, they will soon kill out the grass, and gradually forest conditions will be established.

Q. How do you fill up the gaps in the wood lot?

Dr. Clark: If the better varieties have been allowed to remain in the wood lot, and it is possible to break up the soil with a disc harrow or with any other implement, natural regeneration will soon start, provided live stock be kept out. If it is not practicable to break up the soil, or if only worthless varieties have been left, then it is necessary to plant seedling trees. This can be done very cheaply, as such trees should not cost more than $1 per thousand. Two men can plant an acre a day.

Roland Craig, Department of Forestry, Ottawa: The question of whether the wood lot will pay or not has not been discussed to any extent. No doubt it will be admitted that it will pay on poor land that will not produce agricultural crops. I obtained some figures while in the West which go to show that tree growing may be made profitable even on good land. One of our elm plantations, twelve years old now yields for posts alone sufficient to give an annual profit of $14.33 per acre. Another plantation ten years old yields $12.59 per acre. The ratio of value increases rapidly, and I estimate that in ten years more they will yield $20 per acre in posts alone, and fuel in addition.

Something should be done in the way of planting along streams. Thousands of acres of good agricultural lands have been destroyed in some parts of the Western States through the overflowing of rivers due to forest denudation along their banks. The United States government is now taking this matter up. We might profitably do something in this direction.

Thomas Southworth, Chief of Forestry Bureau, Toronto: Two years ago in the discussion which followed Dr. Fernow's excellent address, I suggested that two things might be done to encourage reafforestation among farmers. One was a change of the assessment law so as to provide for a preferential assessment of wood lots, and second, that trees should be supplied free or at a very low cost to the farmers. The Minister of Agriculture who was present at the time very heartily concurred in the second suggestion, and it has been put into effect at this institution. It is also largely due to the efforts of the Minister that the Department with which I am connected has been given the services of so excellent a man as Dr. Clark.

I have given considerable thought to the question of reafforesting the banks of streams, and it seems to me that it would require concerted action on the part of the municipalities acting in consultation with the Bureau of Forestry. I do not think it can be undertaken successfully by individuals.

Q. What is the best time in the year to plant trees?

DR. CLARK: As soon as the soil is fit to plant in the spring. The quicker you get them in after that the better.

HON. JOHN DRYDEN: I am glad to have had something to do during my time with the forestry movement. Like your President, I am deeply interested in it, and am proud to be one of the farmers of the Province who has about twenty-five acres of original forest on his farm. One of the chief things in the care of the wood lot is to keep the cattle out. If it is a proper wood lot, there is no grass there for them to eat, and the only thing it provides for them is shade. Another important thing is to keep out what I call scrub beech. This is a vigorous grower and spreads all round and soon spoils the lot. It is hard to uproot, and men do not care to tackle it, but it is one of the worst enemies in our wood lot.

I do not know that I am quite prepared to recommend that every farmer should plant a wood lot. On some farms the land is too valuable for that, and will yield greater returns in other ways; but there is in almost every township some land that is fit for nothing else. It would be far better to grow timber on such land than to undertake to work it, trying to wrest from it a living year after year, as many a man does. In England and Scotland you will find timber growing on the rougher parts of the country. This year I saw a piece of forest land of this description that was being cut. The timber had been growing for forty years, and realized $500 per acre. Their plan is to cut it all off and then replant. We have hundreds of thousands of acres that ought to be used in this way. Unfortunately, the men who are trying to make a living on such land are too poor to take the matter up. These men deserve our sympathy and assistance. It is not that they are less industrious than we are, but their land does not bring them in the same returns, and that is often why they are not in as good circumstances as some of the rest of us.

I am glad that the Union is keeping up this agitation. You do not know how much you strengthen the hands of a Minister in a matter of this kind. It was because I felt that I had the young and progressive men of this Union behind me that I ventured to recommend the establishment of this nursery, and to assist the movement in other ways.

I assume that by 1906 we shall have some trees ready to plant. I do not think it should be our policy when that time comes to encourage anyone to plant trees who will not take care of them. I think that our farmers' institute system might be taken advantage of in this connection, and that special meetings should be held under its auspices, at which men like Dr. Clark could talk to the people and show them exactly how the trees ought to be planted. Then, perhaps, it would be desirable to have the men to whom trees are distributed prepare their land the season before. If trees are distributed to people who are not prepared to receive them, and to care for them, failure will result, and it will be very much harder work to get the people interested.

In the meantime I hope that the Union will keep up the discussion of the question, and get all the information available in reference to it.

I do not propose to say anything about the future, but so long as I have anything to do with this work, I shall watch for opportunities to move along advanced lines.

REPORT ON RESOLUTION ON FARM FORESTRY FOR ONTARIO.

By the Secretary.

At the last annual meeting of the Ontario Agricultural and Experimental Union, a resolution was moved by Mr. E. C. Drury, Crown Hill, Ontario, seconded by Mr. T. G. Raynor, Rosehall, Ontario, and carried. The resolution was as follows:

"Whereas, in many sections of settled Ontario the process of deforestation has been carried on far beyond the proportion between woodland and cleared land, shown by the experience of other countries to be necessary to the best maintenance of agricultural conditions, of climate and water supply;

"And whereas a very considerable proportion of lands thus deforested are totally unfit for agriculture, and, in consequence, are at present unproductive;

"And whereas the feasibility of profitably maintaining such area of forest lands has been demonstrated in this Province;

"And whereas the present method of taxing farm woodlands discourages their preservation;

"And whereas the supply of wood products necessary for the general interests of the Province is rapidly diminishing;

"Therefore, the Ontario Agricultural and Experimental Union would strongly urge upon the Government the necessity,

"(1) For establishing at the earliest possible date a School of Forestry, where instruction will be given in practical methods of dealing with forestry problems;

"(2) For collecting accurate information from the municipal authorities as to the amount of lands unfit for agriculture in the settled townships of Ontario;

"(3) For undertaking the practical reforestation of areas sufficiently large to afford forest conditions, as a demonstration of the utility of the work on these lands, which, from their surroundings, enjoy practical immunity from fire;

"(4) For considering some means of adjusting taxation so as to encourage rather than to discourage the preservation of farmers' woodlots."

Soon after the annual meeting this resolution, along with the report presented and the discussion which took place on the subject of forestry, was sent to the Hon. John Dryden, Minister of Agriculture, and also to the Hon. E. J. Davis, Minister of Crown Lands for Ontario. Each of the Ministers replied, stating his interest in this important subject. Soon afterwards the Department of Forestry of the Government was divided into Crown Lands Forestry, which remained under the Crown Lands Department; and Farm Forestry, which was transferred to the Department of Agriculture. The Hon. Mr. Dryden took immediate steps towards having a nursery started at the Agricultural College, and placed a man in charge of this work for the summer. The nursery already contains upwards of 50,000 seedlings of Norway Spruce, White Pine, White Ash, Hard Maple, American Elm, and the White or Tulip Tree. It is hoped that the seedlings will be ready for distribution in the spring of 1906. I am sure the Experimental Union will be very grateful for the progress made in the initiative work of reforesting some of the waste lands in the older parts of the Province.

THE STORY OF "WOODLAND FARM."

By Jos. E. Wing, Mechanicsburg, Ohio.

Although you are strangers to me, and live under a different flag, I do not feel like a foreigner among you, for I realize that you have the same warm hearts as the people I know. I should like to hear the story of everyone here, but we have no time for that, and therefore I am going to tell you mine.

I was born in the hills of Western New York, where my father's farm was on two sides of a hill, and the work was rough and the crop only half a crop. My father was a large, strong man, and he loved the backwoods life. When I was four years old I moved to Ohio and took the family with me. That was the best thing I ever did, I think. There we bought a little farm of nearly one hundred acres of practically level land. It looked so much better than the one we had been accustomed to that father was delighted with it. But pretty soon the neighbors told him he had bought the worst farm in the district; and, when he began to farm it, he found that what they told him was true. In those days men farmed without thought of to-morrow, and did not return to the soil what they took out. This farm had been worked out. The meadows yielded very little grass and the corn was small and yellow. When my father had sized the thing up, he began the first serious work of building up the fertility of the land again; and I helped him. You may wonder how. Well, it was in this way. Father had the biggest hand I ever saw on any man; it was a warm, comfortable kind of hand. He would wrap his big hand round my little one and take me about with him everywhere. While we walked, he talked to me just as though I knew as much as he did, and as though I understood it all; and I did understand. I believe that is the right way to talk to children. If you talk to them just as though they had sense, they will have sense. They know just as much in some ways as you do. I tried to teach my boys in the same way. I do not mean that boys know as much as their parents; but when it comes to real good sense, commend me to the child, provided you talk as you should talk to him. My father would talk in this way: "You remember, Joe, how thin the grass was on that hill? We have got to make the land rich, man, or it won't give us bread. How are we to do it? Manure is what will make it rich. We must feed this land. How? Why, by feeding what we grow to stock, and then selling the stock, putting the manure back on the land, and thus make it rich again." But he did not depend altogether on what he raised on the farm for feed; he bought wheat bran, which was not the custom in that country then.

When I grew big enough I had my regular work to do. I had the calves to feed. I used to cut the corn into pieces half an inch long with a hatchet and pile it up till I had a great heap. Father would come along, and say: "Work away my boy; that corn's worth a dollar a bushel fed to those calves."

On the lower part of the farm there was some swampy land, which father started to drain, and I helped him. I used to run along the ditches and marvel at their depth. There we laid board drains, and the water ran away and the land was brought into successful cultivation.

When I became of age, my father took me into partnership with him, and we worked along together in that way for a year or two quite harmoniously.

But it seemed necessary that I should go away from home. I was threatened with consumption, and thought I would go west. My father said, "Go west, if you think it is necessary; take all the money you want; take $75 if you think you need it; go out there and try it;" and I went west. I had very big ideas of what I was going to do. I was not going to farm. I thought I would be a cashier in a bank or an engineer on a railroad. Eventually, I found myself on a ranch. What a man learns in his youth, he will generally get back to sooner or later. I had grown up by the side of a beef steer, and so I found myself on a ranch. The ranch had not been running very long and things were not in a good shape, as we had a foreman who did not know the work. He was a college professor who had missed his calling. I knew a good deal about cattle, and was really quite useful there. We had a log cabin in which we lived, and the ends of the logs had not been sawn off evenly. One day when it was 110 degrees in the shade, and there was no shade (it was Sunday and I did not go to church because there was none within a hundred miles), I set about sawing off the unsightly ends of the logs with a hand saw. The proprietor, who lived in the city, happened to be at the ranch at the time, and saw me at it. A day or two after when we were riding together over the range, our way took us over a very rocky trail through the mountains, and I walked my horse as I always did when it was tired. Well, I had large feet, and they were very useful in kicking rough stones from the trail down the slope of the mountain. It was a sort of habit with me to kick them away as I walked; and I would not give a cent for a man who could walk over a road and not leave it better than when he started. Apparently the owner of the ranch noticed these two things—that I cut the ends off the logs and kicked stones from the trail. By and by he said: "How would you like to be foreman of the ranch?" After demurring somewhat, I confessed that I would. He said: "Well I'll give you the job; I know you don't know as much as you ought to, but you work when you don't have to, and I think you can do the work on the ranch." So after I had been there for seven months I was made foreman. I lived there for four years—four of the happiest years of my life. You know what it is that makes a man happy—to have all the work he can do of the kind he wants to do, to feel strong and well, and to get up each morning feeling anxious to fly at it, and to work all day at the thing he wants to do, and in company with others who like the same work.

One day there came a letter from home. I used to write father every month or so, and he would write and tell me how things were going at the farm. His mind never went far from his work. This particular letter worried me a good deal: it read: "I want you to come home: I cannot get along without you; hired men are no good, and I need you." I was exercised in my mind over it, and I finally said to one of the boys: "Billy, what do you think of it." He said: "If I had a father who had been as good to me as yours has to you, and he wanted me to come home in his old age, I would go." I said: "I am going, Billy."

I arrived home at Christmas time. It was a happy home coming for me. I walked down the road I knew so well from the station to the farm, and everything was just as I used to know it. When I got inside the house, there was my old mother, with hair a little more silvery than it had been, and father, too. It was like Heaven. But when I walked over the farm, how it had changed! The pastures were not as large as I had thought them: the field that seemed so big to me when I plowed it as a boy, now appeared to be such a little field: the barn that seemed as though it never could be filled, did not look now as though

it would hold enough hay to feed the saddle horses till spring. Father saw me sizing things up. He said: "I suppose it is true that you did great things in the west, and that you had 2,200 head of cattle to pasture, if you say you did." I don't think the old man ever quite believed it, though. He said: "This farm has improved quite a bit," and he told me what he had sold off the farm that year, amounting to a little less than $700. He told me that to encourage me when I have given up a salary a good deal better than that, and all the bright prospects that one has in the West. He said: "That does not seem much to you, may be, but times are harder than when you went away. Since you went I have not been able to do anything to develop it as we used to talk of doing. If you see anything you want to do on the farm, why, go ahead and do it; I'll be the boy now and you the man."

Full of the unrest that stirred within me, urging me to take the first train back to the West, I took another walk over the farm, and came finally to a field that needed draining. I said: "Father, may I drain this field?" "Yes," he said, "it should have been drained long ago." So I bought a new ditching spade, and set to work, for I could not afford to hire much labor on a farm that yielded only $700 a year. As soon as I forced that spade into the earth and got the mud over me, I began to forget the ranch, and my faith in the farm increased. I wonder whether any of you boys who are discouraged with life on the farm at home ever get any of the mud of it on you! I said to myself as I worked: "Here, some day, where only grass grows, I will make alfalfa and corn grow." When spring came I said "Father, these fields look very small; I am not used to it; I should like to raise more stuff, and I wish we could have more stock." "All right," he said, "but I think I know how much of this farm I am rich enough to plow; if you want to plow more, try it." So I did; I plowed bigger fields; but when the time came to gather in the crop, I knew he was right. The part he had remade—forty acres—was as fertile as a garden; the rest was all wrong. I saw I could not make it go unless I did something more. I turned the matter over and over in my mind something like this: "I cannot afford to farm this land; I have to walk too many miles to fill the crib with corn; if I am going to make this a paying proposition, I must make this land rich. How? With manure. But I had not enough stock for that. Near by was a village where they almost gave away manure, selling it at one dollar a load. So I made my wagon box seven feet wide across the top and with two good horses I went and took all I could. Each wagon load represented to me so much good land.

Sometimes a curious thing would happen when I was going along with the load. The road that led past our farm came from a country where the land was very rich, and where the farmers were prosperous. These farmers sent their sons to school, and the sons did not work as much as their fathers; and their grandsons do not work at all sometimes; but that is none of my business. Down there now they have fine homes with beautiful cultured ladies living in them, and young ladies too; some of them are wonderfully nice. I used to meet them sometimes when I was driving home on that load of manure. It did not make any difference to me. I would see a fine carriage, perhaps, coming along, and would say, "That is Alice" (I knew Alice) "I will turn out and give her plenty of room, and then I will give her a nice bow and smile as she passes." But when she got close up, something would happen. Perhaps an emanation from the manure struck her with blindness, so that she could not see at all. Then I would turn red and blush, and get angry and indignant; and afterwards I would make up speeches in my mind of the things I should like to have said to her; you know the way one has. Something like this: "Young woman, you have

been to school, and have culture and knowledge and wealth; is it possible that with all your learning you have so little knowledge of the real goodness and value and virtue that lies in that load of manure? Is it nothing to you that I can turn it out on that poor white clay soil and make it strong, and grow clover and corn and alfalfa; and some day I will make it grow me a home for my sweetheart and my children?" And all that came true one day. So I would drive on down the road, and as I applied the manure to the land, I would say to myself with each forkful: "There is one good spot; there is another; now you be good, and you over there."

The farmer's boy does not have altogether an easy time of it on the farm. I have been through all of it and I know. I have suffered from chillblains and frozen ears, and all the rest of it. I do not blame you for getting tired of living sometimes. You will quit the farm altogether you say, and come to the city for an easier job, which, by the way, you don't find; but if you can only make the load of manure smell like clover blossom; if you can only see the outcome of it—dream and dream and make that dream come true—you can go on with the toil, knowing that the reward will be sweet.

I did not haul all the manure myself. I saw that was not working fast enough, so I hired some help; but it was still too slow, and I began to turn my mind in another direction. I said to myself: "Those old cattle we are feeding out in the woods are well enough so far as they go, but it is a poor speculation, as the manure is wasted in the woods and the cattle are too old when we buy them; what else can I feed?" I felt that it would be of much greater advantage to feed babies; they would give much better returns in the way of growth for what they ate. At last I concluded to raise lambs; I could feed them in the barn, and sell them before they were a year old; so I borrowed money and purchased a car load of 250. After keeping out some for breeders, I fed 175 the first winter. Then I went to one of the most skilful men in the business and learned his methods. When he talked of the necessity for feeding the lambs protein, I became a little scared. What was protein? We did not grow it in our country. However, finally I understood what he meant, and I bought food containing protein, and fed the lambs carefully according to his directions. When spring came, I sold them at a clear profit of $115. Then I saw day-light. I said: "This is a good proposition; if I can make $115 on 175 lambs, it is only a question of having enough lambs;" and I whispered to myself: "Some day I will feed 1,000 lambs on this farm."

But I almost forgot to tell you the most important part of my story, which is, that I married the girl I came home to see the first year I was home. She was living with me in our little house, and she used to help me feed those lambs. Although she had been a town-bred girl, she made a splendid farmer's wife. The girl and I worked together.

It was only a question of having enough lambs, I concluded, and built more sheds. Then I found that I could not always buy protein, but that I should have to produce it on the farm. Wheat bran and oil meal did well enough to be sure, but they kept continually going up and up, and the price of the lambs down and down. Finally I learned to grow alfalfa.

At that time my brother came home from the ranch and joined me in the business, and we became ambitious and borrowed money, and laid drains as the land had to be drained for alfalfa. Finally we had eighteen miles of drains, and had built barns to put the lambs in; and the long and short of it was that we got heavily into debt. This fact did not trouble me in the day time; but when I woke up at two o'clock in the morning and began to think things over, it was a different story. That is the unhandiest time

in the world to wake up if you have a heavy debt over you, or if you have been doing something you do not intend to tell your wife about.

But the productiveness of the farm was going up as well as the debt, and we reasoned it out that it was only a question of one good year, and the farm would pay it all. We made some bad mistakes, but we learned how at last, and the year came when we fed 1,200 lambs, as near alike as peas, from the products of the farm, with the addition of a little corn which we purchased. We sent them to Buffalo where men were looking for our lambs every year, and wanted them and paid the top of the market for them. When the cheque came back, I went to the bank with it; I did not owe a cent in the world except to the banker. He was a good friend of mine, and used to come out to the farm once in a while to see how things looked; but I dare say he had an eye to business at the same time, and wanted to see how we were getting along. When I laid the cheque down I said: "Tell me how we stand? Can I have the note now?" He said "Yes," and handed it out to me. I said: "Tell me what I have left?" He figured for a few minutes and then handed me back my bank book, with $880 on the right side of the ledger. I did not stop in town a minute after that, but went straight home and told my wife. When I reached home, she was standing in the door-way and read the news in my face; and I do not need to tell you that it was the happiest day in my life. On figuring it out, we found we had made a clear profit that year of $2,500, and that on a farm that had yielded only $700 eight years before.

Just to give you an idea of what that farm now produces I may say that this year we cut 350 tons of alfalfa hay and husked 3,000 bushels of corn and had 2,000 bushels of grain. Of course we have added some land to the original farm, but the farm paid for it.

I want to say a word about the share my wife had in all this. I sometimes wonder why it is that some particular man has managed to succeed so well, till one day I see his wife standing beside him. Then I know what was behind that man, and who made him what he is: I say to myself, there is the other half of that man that I had not seen before. This wife of mine was a town girl; she had been raised in luxury; but when she married, she came out to the farm, and never repined at all; and she helped me mightily. Of course she could not go out into the field and work; but she did her work indoors. I worked too hard for the first few years—just about as hard as any man could work. Sometimes a man will work so hard with his muscles that he cannot think with his head. Many a time have I started home from the fields with my shoulders drooping, so tired that the whole thing seemed a weariness and a mockery to me. But the girl would come out to meet me, always with a smile on her lips, and tell me some bright thing that had happened about the boy. She would notice the droop in the shoulders, and would say: "Strighten up, my boy, can't you?" and I would straighten up and throw off my dejected bearing. When I got inside, I would sink into a chair so tired that I could not stir. But presently she would say: "There is a tub of water and a change in the next room; don't you think you would feel better for a bath and clean clothes?" So I would take a bath and a change—she had me well broken in, you see. After that, a good deal refreshed, I would settle down a second time, and would make up my mind that on no account would I stir again; but she would look at me sitting there with a five days' beard on my face, and say "Joe, if you would like me to, I will shave you." I would say "All right;" and she would lather my face. No one could put the lather on as nicely as she could—it was a rest to have her do it. But when she put her arm around my head and began to operate the razor, it was different. She

meant well, but one scrape was enough, and I would suggest as gently as I could, that if she didn't mind, I would do the rest myself. It was these little attentions and these constant expressions of sympathy that helped me to bear up in the struggle; they were more than half the cause of the winning of the final victory.

I wonder whether we always give our wives the credit that is due them? —it is they who inspire us with our highest ideals and make life worth living, and teach us to keep ourselves clean and self-respecting, to stand up martially straight with head erect and courage undiminished, no matter what befall. I hope we do.

ADDRESS.

By Hon. John Dryden, Minister of Agriculture, Toronto.

This is one of two great mass meetings held at Guelph during the week of the Winter Fair. It is at these meetings that we start the enthusiasm going—and it is this enthusiasm which is such a wonderful help to the farmer in the conduct of his business. In times gone by, these audiences consisted entirely of men, young and old, but latterly a change has taken place, and we have the ladies with us in increasing numbers. One reason for this is that we now have here an institution for educating the young women from the farms of our country so that they may become better wives and housekeepers. For a long time, we have been trying at this institution to make better husbands out of the young men; now we have the other branch also. That is not all; we have Women's Institutes scattered all over this Province, and this organization has its central gathering here at this time. I am glad to welcome the lady delegates that are scattered through this audience. If there is any branch of the institute work that I wish success more than another, it is the Women's Branch. The women in the home need help just as much as the men on the farm. I am sure that the women have helped to increase the usefulness of the men's institutes, and the two are working together for the good of the whole community.

When I stood in this room a year ago and was asked to say something, I little thought that it was the last time that we would be under the guidance of our late President, Dr. Mills, and if anybody had asked me on that occasion "Would you like to spare Dr. Mills and try some one else?" I would have said to him, "We cannot spare him, we cannot do without him just now; he is absolutely essential to the well-being and continuance of this College"—but nobody asked our consent. The first thing we knew when we woke up in the morning we found Dr. Mills was gone, moved up to a higher place to associate with the great people of this country at Ottawa. We were all very sorry—I especially, because I think I know him better than almost anybody else. I have come close to him all these years, and have found him so true a man and so good a man that I was sorry to have him taken away. What were we to do for a successor? Where were we to find one worthy to occupy this position? We found him, and I am going to say that, having found him, we all like him. The College is still going on, still moving forward, and still looking to greater success; and I prophesy that the College will succeed and will prosper quite as much during the administration of the present President as it did under Dr. Mills, no matter how good he was.

To-day, I have been forced to think of the past. The unveiling of the portrait of Prof. Panton, and several other things which have taken place, have compelled me to think of the olden days when I first had to do with the government of this institution, and I was thinking of the difference between the College in those days and at present. I was thinking of some of the old buildings. The building that took the place of your present Horticultural Building was a sort of root house as well as a greenhouse. You students don't know anything about it. You never saw it; but there are some old boys here who know all about that. And I was thinking of the old square Dairy Building, with not much furniture in it, and of but little use to the College. I was thinking of the small number of departments in comparison with what we have now. Surely we made considerable progress during the years in which Dr. Mills and I labored together to push the College ahead and make it respected by the people of the country, as it is to-day. I would like to say, Mr. President, that we turned out some pretty good men in those days. It was in those days the President himself walked through here, and some others I can think of. So that, though we have better equipment now and a greater number of buildings, and though we, perhaps, have some better professors—we have some we think a great deal of now, and we believe they are important additions to the institution and all that, yet the successful graduate does not depend altogether on the equipment and on the professors—they are both necessary and essential—but whether the boy or young man turns out a good student or an inferior one will depend on himself, and I want the young men especially to remember that. And I would like them also to understand that, having graduated, they have not finished their education. I am older than any of your graduates who are going through the College this year, and I want to say, I am learning every year. Let the young men remember that they have not concluded their growth, their development in educational lines, when they have laid down the books of the College and walked out of the institution with the graduation papers. They ought then to be in a position to take advantage of every opportunity and to continue their growth for years to come. I was thinking to-day that the people of the country expect too much of the graduate; he has not reached his entire growth when he has finished his studies in the College—not by a good deal. I can see how those who have gone from this College from year to year are growing, the President of your Union among others. And so it will be as the days go by. Do not expect, young men, when you get through your studies in this College that you have finished; there is room for all of you in this young country. Oh, how great a need there is for young men, public-spirited men, men with strength of body and mind, willing to sacrifice themselves if need be for the betterment of the country in which we live, and which, I trust, we all love. I look for this institution in the years to come to make a very distinct impression upon this country—not only this Province, but this Canada of ours; and I want to say that, thought we have universities and colleges of every description, there is not one of them competent to do more for our national growth than this Ontario Agricultural College, which we are here to honor on this occasion. I am very glad indeed that I have been permitted to spend some of the best years of my life in working out its success. I am very glad to look back and see the changes which have been made, all for the best, but there is a good deal yet to do, and, if I am permitted, I shall be glad to help it forward in the years to come, until it is even a greater success than it has been in the years that are passed.

THE ONTARIO AGRICULTURAL COLLEGE.

By President G. C. Creelman, Ontario Agricultural College, Guelph.

In taking up the work of a man who was known throughout the length and breadth of this land for his capacity, integrity, fair-mindedness, generosity, and executive ability, I do not think I should be blamed when I say that in doing so I am filled with modesty and timidity. But having taken up the work, I am determined to go forward with it; and although I do not possess all his attributes, to make the most of such as I have. If in my efforts I receive the backing of such men as I see in the audience this evening—men who truly represent our great agricultural population—I feel sure that, in spite of the change made in its executive head, the College will still go forward in its career of usefulness.

I desire particularly to welcome the ex-students who are present. I find that in the twenty-five year period between the years 1874 and 1898, 1,646 young men registered at this institution and took the whole or a part of the course. Of that number, 102 have since died, 207 we are unable to trace; but there are 1,337 whose whereabouts we know, and I am glad to be able to say that 54 per cent. of these are now living in the Province, and of that number, 71 per cent. by actual count are farmers and living on farms.

The criticism has often been made that this institution is turning out professors—that our students by book-learning are spoiled for farm life. I think the fact that 71 per cent. of those now living in the Province are actively engaged in farming, refutes this argument. This, it appears to me, is a better record than many colleges that fit men for the learned professions can show.

Unfortunately, perhaps, the great country to the south of us with its seventy millions of people, its great wealth, its splendid institutions of learning, has attracted quite a number of our graduates. The criticism has been made that the boys who receive their training at this institution go to the United States and take positions there in agricultural colleges, become American citizens and are lost to this country. Admitting this to be true to some extent, I do not think that it is an unmixed evil. When we consider that in 35 States in the American Union our boys hold responsible positions, as professors, directors, experimenters, etc., I think all must admit that it is somewhat of a compliment. It has been one of the aims and objects of this institution to meet this very requirement. In the early nineties when hard times came to this country and to the United States, the agricultural colleges on the other side felt compelled on account of the competition of other institutions of learning to add mechanical, electrical, and other similar courses to their agricultural course, in order to keep up the attendance and to justify the grants they received. Now that prosperous times have come again in agriculture, these institutions find themselves loaded up with literary professors, mechanical professors, commercial professors; but when a professor of agriculture or a professor in animal husbandry is required, there are few available in that country, and they are obliged to turn to this institution to secure men capable of instructing their students in these departments. But other agricultural colleges are now being established in this Dominion—one in Nova Scotia, one in Manitoba, and one which Sir William Macdonald is establishing at Montreal. When these are established, it may be that our graduates who are now in the United States will be brought back to take prominent positions in these institutions. If that should prove to be the case, we may take credit for

having prepared some of our brightest young men to take positions in the United States, where they have been enabled to broaden their knowledge and experience, and to come back to us all the better for having been away for a time.

Many of our students have gone into other fields of work and have become prominent in them. I could mention some who are prominent in the field of politics, others who are successful in agricultural newspaper work —men who stand out conspicuously in Canadian agriculture, and who received their inspiration and training at this institution.

I think it will not be out of place for me to say a word or two on this occasion as to the future, and as to the policy we are endeavoring to carry out. In this connection let me say that the lines have been laid down so truly by my predecessor that it is quite possible for a new president, for the first few months at any rate, to simply take the helm and let things drift without meeting with any severe criticism. I am pleased to say that I find my relations with the faculty to be most harmonious. I find that without exception they are men who are working hard and sincerely in their respective departments. Therefore, everything is running satisfactorily at the present time, and it will be time enough in the years that are to come for my friends to take up a serious criticism of the work upon which my reputation as head of this institution must stand or fall.

There are one or two new departures which we hope to inaugurate in the near future, to which I should like to call the attention of those present. First, we need here a machinery hall—a hall that will accommodate samples of the various machines and implements used in farming operations, so that the students may inspect them, take them apart and put them together and then set them in motion to see that they are properly put together. The unthinking man may say, "Why don't you do that on the farm?" There are two reasons; first, the boys are not here during the spring and summer seasons; and in the second place if they were here, it would hardly be practicable to take them out into a field of wheat that was ready to cut, and wait until every boy in the institution had taken the reaper apart and put it together again.

Further than that, we require a mechanical instructor in connection with this machinery department. I felt when I was a student at this institution that there was a lack of practical instruction to the students on account of the great amount of study required to master the principles underlying agriculture. It is impossible for the Professor of Agriculture to take 180 boys out into the field one after another, and give them such practical instruction in actual farming operations as they should have. A special officer is needed for it, one who has special knowledge of agricultural machinery; who can show the students how to dig a drain and lay tile, and operate farm machinery of all kinds; whose special business it shall be to go from group to group of students as they are at work in the fields and give them instruction in the particular work at which they are engaged.

We require also more laboratory room. I do not think there is any institution on this continent that, taken all round, is better equipped than we are, thanks to those who have been in control of the institution. We have a splendid lot of buildings, which compare most favorably with any institution of its kind anywhere. At the same time, we must continue to go ahead or we shall drop behind. We need more accommodation in the chemical, bacteriological, and physical laboratories. In connection with the latter, a glass-house is required where the Professor of Physics can work out the problems of the soil under summer conditions all the year round. The present time, when both parties in the Legislature are trying

to climb on our agricultural platform, so to speak, is, I think, a good time to ask for these things, so that our equipment may be still more complete, and the youth of our land may be adequately fitted for the calling of agriculture.

PRESENTATION TO DR. JAMES MILLS FROM THE EX-OFFICERS AND EX-STUDENTS OF THE ONTARIO AGRICULTURAL COLLEGE.

One of the pleasing events of the meeting was the presentation by the ex-officers and ex-students to Dr. Mills of a handsome oak cabinet of silver. Mr. E. C. Drury read the following address, and Mr. Nelson Monteith made the presentation:

"Dear Mr. Mills,—As ex-officers and ex-students of the Ontario Agricultural College, we wish to take advantage of this opportunity to express to you our sincerest appreciation of your long, brilliant, and faithful services as President of our Alma Mater. At the same time, we desire to extend to you our heartiest congratulations upon your appointment to the high, honorable, and important position of Dominion Railway Commissioner.

We believe, sir, you came to this College in the year 1879, when there were only five professors on the staff and only 162 students in attendance. At that time the public of Ontario did not recognize the value of science as applied to agriculture; certainly very few of our farmers looked with favor upon the work under your charge. Conditions have greatly changed since then. New laboratories have been erected, new departments have been developed, professors and instructors added to the staff, and the attendance gradually increased until this, our Alma Mater, has become the first institution of its kind in the world. You had, during your last year as President, thirty professors and nearly eight hundred students, the majority of whom were from the farms of Ontario.

We appreciate the ability and wonderful attention to details which you have displayed during your Presidency, but, more than all, we are grateful for the personal interest you have taken in each of us, inspiring in our hearts a deep personal affection. We believe we are better citizens and better men because of your friendship and influence. We express the hope that your life in your present position may be full of years and honor.

Will you kindly accept this cabinet of silver as a small token of our personal regard for yourself, Mrs. Mills, and your family.

Dr. Mills made the following reply:

Ladies and Gentlemen,—As I intimated to you this afternoon, I gave heartfelt thanks when I reached the city of Ottawa, in anticipation of the fact that no more public speaking would be required of me. You know when one is acting as judge on the bench he does not or should not make speeches; he is supposed simply to listen to evidence or argument, and ask a question or make an observation when he feels disposed to do so. But once more I am where I used to be, and, I suppose, as the man said, "I must make a few broken observations." I confess to you I scarcely know what to say. First of all I ought to say, and it is scarcely necessary for me to say, on behalf of Mrs. Mills and my family, that we greatly appreciate this valuable gift from the ex-officers and the ex-students of the College.

one of great value in itself and one of greatly increased value because of the source from which it comes. Of course, a man in the position of President of a College is not always able to do what the students think he ought to do; he sometimes is at cross-purposes with them, and, as Dr. Robertson intimated to-day, an Irishman especially is apt to say things a little warmly and strongly now and then; but he is just as sure to tone down and almost feel like apologizing. I have often felt that way myself, and I suppose that is the reason why the students who have gone out from the College were disposed to overlook failings and do a thing as handsome as they have done to-night. Until a short time ago, I did not anticipate anything of the kind, because I felt our officers, our students, and our ex-students had been heavily taxed during the past year in contributions to prizes and various things that have been altogether exceptions. Mrs. Craig and myself have both benefited on account of our resignations, and of going down to Ottawa. Mrs. Craig has accompanied me there, and I do not know how many more may come to Ottawa if we have good places to fill.

It is no mere platitude to say that the ex-students of every college and institution of learning are the strength and glory of that institution; and I am more than pleased to notice that the students of this institution are filling a wider and more important place in the Dominion of Canada than ever before, that their worth is beginning to be very generally and fully recognized. Many of you cannot have failed to notice their worth as farmers first of all, and especially their worth as farm managers. It is a most difficult thing in this country to find a good farm manager, a man who can manage a farm so as to make it pay. I suppose in the last year or two I was in the Presidency here I had to say "No" to more than a score of applications for farm managers across the line, and a large number of applications in our own country. I am also glad to see that our young men are gradually getting their hands on the agricultural journalism of this country; the *Maritime Agriculturist* is controlled by one of our young men; the Northwest edition of the *Farmers' Advocate* is in charge of two of our men, Mr. Black and Mr. Geddes; the *Nor' West Farmer* has lately taken on Mr. Ketchen as editor; and the agricultural department of the *Mail and Empire* is also in charge of one of our men; and several of our graduates are on the Home Department of the *Farmers' Advocate* in London. This shows that the training our men get here is being recognized along that line; but specially have the graduates been recognized all over this Dominion and far outside of the Dominion as competent and reliable and efficient professors; Professors of Agriculture, of Animal Husbandry, of Horticulture, of Dairying, of Chemistry, of Biology, of Botany, of Bacteriology. I doubt whether there is another college on this continent which has so many Professors of Animal Husbandry as the O. A. C. I am glad to see that when the Dominion Department of Agriculture want efficient and thorough-going men in all their departments they send here for them. We have here to-night Mr. Clark, representing the Seed Department in Ottawa; one of them is going to Nova Scotia Agricultural College to take charge of the work there under the recommendation of Prof. Robertson. I do not know whether Prof. Robertson may yet have an opportunity of recommending a man for New Brunswick, although he has given the people of that Province detailed advice as to what he thought would be the proper course for them to pursue; and I have no doubt one of our graduates will be chosen for the Agricultural College in the Northwest. We have also two of our men in the Department of Forestry at Ottawa, Mr. Ross and Mr. Craig, who are here with us on this occasion. Then we have with us to-night our old

resident master, Judson Freeman Clark, for some time Professor in Cornell University in the Department of Forestry there, and now Lecturer on Forestry in Canada, Lecturer in Forestry at Guelph, and some say at Queen's University. I have no doubt that with Mr. Clark and Mr. Zavitz there will be a very forward movement in this important branch, that is, the reforesting of the waste places in Ontario and the protection of forest areas on the farms of the Province, and on the larger areas to the north in New Ontario. I am pleased to see these men in the different departments, but I want to emphasize what the Minister of Agriculture said a while ago, that the best the colleges and universities can do for a young man is to give him a fair start and inspire him with a desire to make the best and the most of himself in every situation and relation of life. As I have always said to you, I say again, "Take off your coats, and go to work and do something." Prof. Robertson has said that the man who gets things done is the man you want, and not the one who will give excuses for their not being done. Get things done wherever you go, and this College will grow and fill a larger and larger place in this Dominion of Canada. Our friends from the U. S. must excuse us for boasting a little on an occasion of this kind, but we sometimes fall into it at our annual reunion. I thank you all, and especially the ex-students of the College, and wish you abundant success.

UNVEILING OF THE PORTRAIT OF THE LATE PROFESSOR JAMES HOYES PANTON.

Walter James Brown, Principal Canadian Correspondence College, Toronto: There is a peculiar and tender sentiment connected with this memorial. It expresses unity of sympathy, an appreciation of noble character, and a desire on the part of the alumni of this College to pay a lasting tribute to one who laboured unselfishly and long, in the interests of science and for the uplifting of humanity.

This work of art was projected by Prof. Panton's students. Their love inspired it. Their contributions have helped to make it a reality. Future generations will profit by the inspiration, character and life it so truthfully portrays. His face, as we remember it, expressed gentleness and firmness, tenderness and strength. He had a warm heart and a great mind, each fighting for the mastery. He was a man of the highest rectitude and unswerving in principle, resolute, full of energy, modest, tireless in industry, unfaltering in his determination to make the most of his opportunities and withal, laudably ambitious. A critical study of his career only enhances our estimation of his splendid abilities and unimpeachable character.

James Hoyes Panton was born in Cupar-of-Fife, Scotland, in the year 1847. From his native land he inherited a love for out of door life, and an appreciation of the beautiful in nature. His manhood revealed his deep religious convictions and dauntless courage. His family were descended from no less a person than King Robert the Bruce, and their history is interwoven with that of the house of Douglas. When James was a year old his father came to Canada and settled in Toronto. A few years later the young mother and her children were left alone, without resources, in a strange land, to struggle for existence. When James was seven years of age the family moved into the country near Oshawa. The freedom of the open air, plain food, and hard work in the fields, laid the foundation for

health and a strong constitution in the growing boy. He learned to care for animals, to take an interest in farming operations and in the flowers, birds and insects, which gave to the changing seasons an interest peculiarly their own. At seventeen he was successful in securing a school at Cedardale. His enthusiasm and ability filled his classes with eager pupils, many of whom were older than he himself. His heart was in his work, and soon he was recognized as a leader in the intellectual and religious activities of the community. In 1873 he matriculated at the University of Toronto. In 1877 he graduated with honors in Science and gained in the academic halls of his Alma Mater one of the most coveted medals. For a time he supported himself by private tutoring. Later he was appointed Professor of Science in this College. From 1878 to 1882 his energies were devoted without stint to his duties as a teacher, frequently delivering from fifteen to seventeen lectures a week. He performed an important work in developing the technical and scientific side of agriculture during the most trying years in the history of our Alma Mater, years when every step was beset with difficulties, when science as applied to agriculture was held up to ridicule, and this College, now famous throughout the world, had to struggle for recognition.

Prof. Panton spent two years in Winnipeg gaining an experience of a varied and interesting character. He returned to the College as Professor of Natural History near the beginning of 1885. It was during this year, as a recognition of his valuable work in science, that he was elected a Fellow of the Geological Society of London, England. From this time forward intense earnestness and great activity added lustre to his reputation and multiplied his achievements. He studied hard, travelled widely, and delivered hundreds of scientific, popular and descriptive lectures to thousands of appreciative listeners. He was a prolific writer, a careful investigator, and a zealous exponent of scientific study and practice.

Perhaps the most striking characteristic of his work as a teacher was his splendid enthusiasm. He unfolded to us the laws of nature, her secrets, and her beauties. Common objects became full of interest and instruction. Each tree, shrub, and flower, bird and insect, had a story of its own. The scales were removed from our eyes. We saw a new world, we heard new music and felt a strange thrill as he led us through nature to nature's God. Well do we remember with what power he delivered his lectures on his favorite subject—Geology. He showed us how the featureless simplicity of this globe had given place to continent and ocean, mountain and valley, plain and plateau, river and lake, cataract and glacier; how ores had been stored in veins, and coal accummulated in strata, and rock material crystalized into giant strength and gem-like beauty; how the earth had to come to be a fit dwelling for a creature of such physical and spiritual needs and capacities as those of man; and how in the progress of life, those plants and animals had been evolved which could minister to man's physical and mental requirements. He showed how the upward progress from Protozoan simplicity, through Fish and Amphibian and Reptile and Mammal, had culminated at last in man himself, the crown of creation, sharing with the animal kingdom a place in nature, but asserting by his intellectual and spiritual endowments a place above nature. He emphasized the fact that the science of Geology leaves full scope for faith, and that the power, whose modes of working may be revealed only in part, is intelligent and personal, while the whole process of the evolution of man and his dwelling place has been guided by infinite Wisdom to the fulfilment of a purpose of infinite love.

Prof. Panton was not only a gentleman of excellent type and a scholar of ripe experience, but a Christian who lived and worked with singleness of purpose. His personality was attractive, his ideals high, while good deeds added fragrance to his character. He was beloved by his students, whose lives he touched in many cases at their most vital points. The importance of this influence during the pivotal and character-forming years in the lives of hundreds of young men cannot be over-estimated. He not only discharged his duty, but he took every opportunity to broaden, enrich, and stimulate those who came within the range of his influence. In his fiftieth year, in the prime of his manhood, he launched forth upon the boundless ocean from whose farther shore no mariner sets sail. May the lessons of his noble life, which had its full share of shadows, disappointments and toil, prove a stimulus to the youth of our beloved country. May we as young men emulate the life of one who was the embodiment of character and power.

C. C. James, M.A., Deputy Minister of Agriculture, Toronto: I do not know that I can add anything to the very beautiful eulogy to which we have just listened. Mr. Brown has spoken on behalf of the ex-students. In doing so he has simply voiced the sentiment of hundreds of ex-students, who look back upon the days spent in Professor Panton's class-rooms as among the most helpful and interesting in their lives. It is fitting that, in addition, there should be added some remarks on behalf of those who were associated with him in the work of the College, and, therefore, I have been asked to say a word or two. It is about nineteen years since I came to this institution. I shall never forget the kind reception I met here. Among those who greeted me, nothing inspired me more than the words of welcome of Professor Panton. While the students appreciated him from their point of view, those who worked side by side with him appreciated him too; and as we look back with the perspective of time, our appreciation increases rather than decreases. Therefore, the officers of this institution would like to add their words to those of Mr. Brown, and try to impress in some way, not upon those who have gone before, but upon those who are here now, that from this picture, which will hang for many years upon your walls, there will look forth the man as we knew him, inspiring in his work, helpful in his association, and altogether conducive to the making of better students and better men.

Professor Panton was a teacher well prepared for his work. He was a hard worker; those who worked with him never had to complain of his shirking his duty; he was ready and willing to take more than his share. He was an enthusiastic teacher, and the enthusiasm that showed through his work inspired us and helped to make his classes so impressive on the student. He was a good citizen; none ever heard him decry his country; he had a great faith in Canada and great hopes for her future. He was not only all these things, but a faithful friend to those with whom he was associated, teachers and pupils alike. None ever felt like taking liberties with him; none felt like condescending to him. He was a brother to teacher and student alike, and we who worked with him received as much inspiration from him in our walks and conversations as you did in the class room. Above all else, he was an honest, upright Christian gentleman.

We trust that his portrait, which we are about to unveil, will recall to old students and old officers the face of a man whom we learned to love; that it will serve as an inspiration for years to come; and that those who attend the College will be better for the fact that it hangs upon these walls.

The committee that had this matter in charge is exceedingly grateful to those who assisted in the matter, and to Mr. Grier, who entered into the work with a love and an appreciation not less than that displayed by Professor Panton's old students.

On behalf of the ex-students and ex-officers we beg to present this picture of our old friend, and may it long serve as an inspiration to those who have gone before and to those who are to come after.

Dr. James Mills: I was intimately associated with Professor Panton during the time he was connected with this institution. I knew of his trials and troubles, and his humor and cheerfulness amid them all. He abounded in the highest type of Scotch humor. Above everything else was his fidelity to duty. I can point to him as a model man, and the highest type of Christian citizen with whom I ever associated.

UNVEILING OF PORTRAIT OF DR. JAMES MILLS.

Dr. J. W. Robertson, Commissioner of Agriculture, Ottawa: It is not difficult to understand the desire of the student body to have a portrait of Dr. Mills in this institution; and the act which I am to perform in unveiling it is a most agreeable one. Dr. Mills has followed my example, in becoming an ex-officer of the College and in going to Ottawa to reside. That qualifies me to speak with a good deal of sympathy for the feelings I know he must cherish towards this place and those whom he has left behind. Those of us who know him and his work here since 1879 cannot overestimate the splendid achievements that stand to his credit as President of this institution. In the early days of the O. A. C. comparatively few of the small list of students came from the rural homes of this Province. It is recorded that in the spring term of 1884—that is ten years after the College was opened—there were only nine students from the farms of Ontario in attendance. During the first twelve years of the history of the College—1874 to 1885, inclusive—there had been altogether 858 students in attendance, some for a short time and others for periods of two years or over; of these, 101 young men all told, received diplomas. During 1903, the last year of Dr. Mills' term as President, there were altogether 728 students, most of them from Ontario; 36 received diplomas, and 16 after a four-year course won degrees from the University of Toronto, with which the College is affiliated. That this was a place of no reputation, when Dr. Mills became President, is the gentlest compliment I can pay it. Not wholly due to his labors, but always under his influence and guidance, this College has continued to give a better training to the young men who came here. At the same time it has elevated the estimates, the attainments and the ideals of farm life, of rural occupations and of citizenship generally. The quality of education at a college is not measured by the number of its students, but by the character and work, by the quality of the lives of those who pass through its classes out into the ranks of laborers to bear the heat and burden of the day.

To his fellow workers Dr. Mills has always been an honest, able man, spending his strength lavishly as President, recklessly as friend. The students from their standpoint knew him a man of fine warmth of disposition, and while that warmth might sometimes flare up in the quick wrath of Irish vehemence of rebuke in the presence of some meanness or fault, he ever had that divine and human excellence which "will not keep his anger for ever." Those who were scorched "from the throne" had only their little misdemeanors burnt, while a minute afterwards the fires of true manliness were

enkindled and encouraged by his kindly smile and the slap-pat on the back from his fatherly hand.

Ability to do these things did not come by intuition or inspiration, but —from the time when he left the farm, and I think I may say during the time he was a boy on the farm—from his earnest labors to enrich his own nature that he might make his life a blessing to others. That is the way life is enriched; some one enriching his own experiences, and passing on the fruits, the guidance, the encouragement, the nourishment and the comfort, to others.

I know of no man who has touched the citizenship of this Province more helpfully than Dr. Mills, from the Senate of the University, through the high schools, and the public schools into the farm homes. Through that whole range his unselfish enthusiasms, his sagacity and industry have made this Province richer and better. That is a great record for any man. If I were sure that for each one of us this life ends all—and I would rather be sure of quite the opposite—still I would cherish this of him and for him, that he has attained the greatest possible success in human life, in that his life shall live on for good through those of the boys and girls in the common schools, in the high schools and in the university halls, and on through those in the farm homes of this Province for all time to come.

Dr. Mills is a product of generations of earnest, right-living men and women. While we admire this work of art and the ability and skill which have produced it, there is something higher for our observation and appreciation than art on canvas; it is the art of living so that one's life becomes part of other lives for their betterment, for their beauty, strength and happiness. To the artist our thanks are due for this admirable portrait, work of art; and we count ourselves doubly happy because we have with us in the original a still higher type of work, "An honest man, the noblest work of God." "He lives pure; he speaks true; he rights wrong." Long may he be spared to us.

Mr. H. L. Fulmer, on behalf of the graduating class of 1904, presented the portrait of Dr. Mills to the Ontario Agricultural College. In this act the class wished to show their high appreciation of Dr. Mills and their true loyalty to their Alma Mater.

APPLICATION FOR AN INCREASED GRANT FOR 1905.

It was moved by R. F. Holtermann, seconded by Professor H. L. Hutt, and carried unanimously, "That the Union ask for an increase of $500 in the Government grant, and that the following constitute a committee to bring the matter before the Minister of Agriculture: Nelson Monteith and George A. Putnam."

CLASS RE-UNIONS FOR EX-STUDENTS.

F. C. Elford, Ottawa: It is somewhat unfortunate that ex-students do not attend more regularly the annual convention of the Union. Some are present year after year, but others come once, perhaps, and then drop out. I think we should consider whether something could not be done to retain their interest. A class re-union might be an aid in this direction, combined with a special supper for the ex-students. I believe also that county associations would enable ex-students to meet each other occasionally, and be useful in keeping alive a deeper interest in the movement.

After some discussion as to the best means to employ in order to interest a larger number of ex-students of the College, the President, on a motion being carried to that effect, appointed G. Fred. Marsh, F. C. Elford, and R. J. Deachman a committee to consider the matter and present recommendations to the meeting.

At a later stage in the proceedings, the following recommendations were presented by the committee:

(1) The wearing of an old boy's badge, with the College year given in figures of a good size.

(2) The organization of county or district associations, as most convenient.

(3) The election of class presidents, either annually or for a term of years.

(4) The co-operation between the above and the College Review; and the appointment of a committee to aid in securing the attendance of ex-students at the annual meeting of the Experimental Union.

(5) The reserving for the use of ex-students a certain part of the lecture room at the time of the Union meeting, and also of the dining hall at the time of the annual supper.

(6) The setting apart of Wednesday as Old Boys' Day, to begin with a special session devoted to re-union exercises, with an opportunity to have a photograph taken of the ex-students present; this to be followed by a tour through the College, ending with a dinner in the College dining room, or in some other convenient place.

THE O. A. C. REVIEW AS THE OFFICIAL ORGAN OF THE EXPERIMENTAL UNION.

By Prof. G. E. Day, O. A. C., Guelph.

I am sure that all who are present will agree with me when I say that the *Review* is past that stage when it was considered a compliment to the students to subscribe for the College paper. To-day it is a wide-awake, progressive, agricultural journal, and is worth many times the subscription price. You will also agree with me when I say that it was a wise move on the part of the management of the Experimental Union to make the *Review* the official organ of that organization. Those who subscribe to the *Review* will not need to be told to what extent it has been instrumental in promoting the interests of the Union; but those who are not subscribers should, in their own intersts, become subscribers at once, and thus derive full benefit from the information contained in this enterprising publication.

R. J. Deachman, Editor O. A. C. *Review*: Those in charge of the O. A. C. *Review* have many schemes in mind for its advancement. They are striving to lay, broad and deep, the foundation of a magazine that will not only be the organ of the Experimental Union, but also of the Farmers' Institutes, and that will be thoroughly representative of the most advanced agricultural thought of the Dominion. What is needed is the thorough co-operation of every ex-student who has the interest of the paper at heart. It is a small matter to appeal to them to renew their subscription without any delay, but, small as it is, the fifty cents is of vital importance to the *Review*. Circulation must be maintained, if advertising patronage is to be kept up, and only by this means can the necessary financial support be had. In conclusion, I wish to thank the friends of the paper for their past assistance.

THIRTY-SIXTH ANNUAL REPORT

OF THE

Fruit Growers' Association

OF

Ontario

1904

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO).

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To the Honourable WILLIAM MORTIMER CLARK, K. C.,
Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

I have the pleasure to present herewith for the consideration of your Honour the report of the Ontario Fruit Growers' Association, for 1904.

Respectively submitted,

NELSON MONTEITH,

Minister of Agriculture.

Toronto, 1905.

CONTENTS.

FRUIT GROWERS' ASSOCIATION.

PAGE.

List of Officers for 1905 6
Directors' Meeting 7
President's Address: W. H. Bunting 7
Report of the Executive: P. W. Hodgetts 8
Report of Industrial Fruit Exhibit, 1904 12
Treasurer's Report 20
Report of Business Manager of the "Canadian Horticulturist": H. B. Cowan 21
Directors' Meeting 27
My Tour Amongst Our Societies: Wm. Hunt 28
President's Address: W. H. Bunting 32
Committees 35
Report of Transportation Committee 36
Report on the "Canadian Horticulturist": H. B. Cowan 38
Report on New and Seeding Fruits: H. L. Hutt 40
Report on Fruits for 1904: W. T. Macoun 42
Handling the Fruit Crop for Cold Storage: G. Harold Powell 45
The Trial Shipments of Fruit to Winnipeg: Prof. J. B. Reynolds 50
The Condition of our Export Trade in Canned Goods with Great Britain: W. P. Gamble 56
The Black Rot of Grapes in Ohio: Prof. W. Lochhead 60
Diseases of the Grape in Ontario in 1904: W. T. Macoun 61
Latest Results from Spraying for San Jose Scale: Prof. R. Harcourt 66
Co-operative Work in 1904 70
Continuing Fruit, Flower and Honey Show 77
Fruit Growing in Quebec: J. C. Chapais 77
Fruit Conditions in Victoria County during 1904: Thos. Beall 81
Report of Committee on Fruit Exhibit 82
The Fruit, Flower and Honey Show 84
Address: Hon. John Dryden 88
Address of Welcome: Mayor T. Urquhart 90
The Value of Flowers: C. C. James 91
What the Little Bee is Doing: Dr. James Fletcher 94

PROVINCIAL HORTICULTURAL CONVENTION.

The Planting of Home and School Grounds: Prof. H. L. Hutt 97
Interesting Young People in Horticulture: A. K. Goodman 108
Horticultural Societies: What they are Doing 112
The Agriculture and Arts Act: How it affects Horticultural Societies: H. B. Cowan 114
Best Annuals and Perennials for Cut Flowers: Roderick Cameron 118
Hardy Vines for the House and Garden: W. T. Macoun 120
What may be Sown in a Small Garden during the Season: R. B. Whyte 122
The Care of Window Plants: Wm. Hunt 126
The Relation of Birds to Agriculture: C. W. Nash 128

Fruit Growers' Association of Ontario.

OFFICERS FOR 1905.

Hon. President - - - W. H. Bunting, St. Catharines.

President - - - - Alex. McNeill, Ottawa.

Vice-President - - - J. S. Scarff, Woodstock.

Secretary-Treasurer - - - P. W. Hodgetts, Parliament Buildings, Toronto.

Directors.

Agricultural Division	No. 1	A. D. Harkness, Irena.
"	2	R. B. Whyte, Ottawa.
"	3	Harold Jones, Maitland.
"	4	W. H. Dempsey, Trenton.
"	5	W. Rickard, Newcastle.
"	6	Elmer Lick, Oshawa.
"	7	M. Pettit, Winona.
"	8	C. W. Vanduser, Grimsby.
"	9	H. H. Groff, Simcoe.
"	10	A. E. Sherrington, Walkerton.
"	11	T. H. Race, Mitchell.
"	12	J. L. Hilborn, Leamington.
"	13	G. C. Caston, Craighurst.

Ontario Agricultural College: Prof. H. L. Hutt.

Honorary Directors: Thos. Beall, Lindsay; A. M. Smith, St. Catharines; W. T. Macoun, C. E. F., Ottawa.

Auditor: J. M. Duff, Guelph.

REPRESENTATIVES TO FAIR BOARDS.

London: T. H. Race, Mitchell; J. S. Scarff, Woodstock.

Ottawa: R. B. Whyte, Ottawa; Harold Jones, Maitland.

Toronto: W. E. Wellington, Toronto; W. H. Bunting, St. Catharines.

COMMITTEES.

Executive: President, Vice-President and Secretary.

Board of Control Fruit Experiment Stations: Elected by the Association: A. M. Smith, Elmer Lick, W. T. Macoun; G. C. Creelman, Chairman; Prof. H. L. Hutt, P. W. Hodgetts.

New Fruits: Prof. H. L. Lutt, W. T. Macoun, E. Morris.

Transportation: W. H. Bunting, R. J. Graham, H. W. Dawson, W. L. Smith, E. D. Smith, Robt. Thompson.

Co-operation: A. E. Sherrington, Robt. Thompson, D. Johnson, E. Lick, A. W. Peart, W. D. A. Ross.

FRUIT GROWERS' ASSOCIATION OF ONTARIO.

DIRECTORS' MEETING.

A meeting of the Directors of the Fruit Growers' Association of Ontario was held in the Parliament Buildings, Toronto, Nov. 16th, 1904, at 4 p.m. President W. H. Bunting, of St. Catharines, presided, and the following gentlemen were present:

A. D. Harkness, Irena; R. B. Whyte, Ottawa; A. E. Sherrington, Walkerton; M. Petitt, Winona; G. C. Caston, Craighurst; A. M. Smith, St. Catharines; Thos. Beall, Lindsay; Alex. McNeill, Ottawa; W. T. Macoun, C. E. F., Ottawa; Elmer Lick, Oshawa; J. L. Hilborn, Leamington; W. H. Dempsey, Trenton; Prof. H. L. Hutt, O.A.C., Guelph; E. Morris, Fonthill; Harold Jones, Maitland; H. B. Cowan, Toronto; J. S. Scarff, Woodstock; and Secretary-Treasurer P. W. Hodgetts, Parliament Buildings, Toronto.

PRESIDENT'S ADDRESS.

The meeting of the directorate of the Provincial Association has taken place infrequently, owing to the widely separated condition of our residences, and in the past, as far as my recollection is concerned, there has been a good deal of work required to be condensed into a very short time. I think, perhaps, this is one of the weaknesses of the Provincial Association, that it is not possible for the directors to get together more frequently and talk over important matters that ought to be discussed by this Board.

We are to-day, it seems to me, on the verge of what ought to be a very important era in the Provincial Association and its affairs, and no doubt the matters that will be brought to your attention will require your most serious consideration. It will be necessary to be very careful about making any change in our procedure or in the affairs of our Association unless we are quite sure these changes will be for the benefit of all concerned.

I am glad to see so many directors present to-day, and am pleased to welcome you to the meeting in Toronto. I trust our stay together here will be of such a nature that we will return to our homes feeling well repaid for our visit to Toronto this time. We have not only learned something ourselves, and had a certain amount of pleasure, but we will be able to return to our homes enthused with higher ideals of our occupation and with more determined effort, individually, to push the Fruit Growers' Association of Ontario in our immedate district.

The secretary read the minutes of the last Directors' Meeting, which, on motion of Thos. Beall, seconded by Alex. McNeill, were confirmed.

REPORT OF THE EXECUTIVE.

By P. W. Hodgetts, Secretary, Toronto.

The work of the Association was carried on by Mr. Creelman, as Secretary, during December, 1903, and January, 1904. About the first of February Mr. Creelman left Toronto to take up his new position as President of the Ontario Agricultural College, and by direction of the Executive, I was appointed to act as Secretary-Treasurer for the balance of the year. Mr. Creelman had left the work in good shape, and as I had charge under him of all matters in connection with the Association before his resignation, I was quite familiar with the work. All matters of importance were submitted to the Executive, and I found both Mr. Bunting and Mr. McNeill always willing to lend me their assistance even during their busiest seasons.

As in the past, I have embodied in this report material which, while important enough for printing in the annual proceedings of the Association, is already somewhat familiar to the directors. This I will not touch upon here. The work of the Association during the year has been somewhat along the same lines as in former years. Owing to the scarcity of funds, little new work has been undertaken, and up to the present, the "Horticulturist" has required the balance of the grant left after paying the expenses of the annual convention, and the running expenses of the Association during the year. Should the "Horticulturist' come under separate management, the Executive hope next year to launch out into new lines of work as outlined by the incoming directorate. With the formation of a separate Association to undertake the work of the Horticultural Societies, the efforts of this Association may be more largely directed toward assisting the fruit interests purely of the Province. In the past, our energies have been divided, and the time of the Executive has been largely taken up in deciding matters relative to the Horticultural Societies, and our official organ "The Horticulturist". It has been felt in some quarters that the Fruit Growers' Association is not doing what it should to look after the commercial interests of the ever-increasing fruit trade of Ontario. Statistics of the Bureau of Industries show that of 10,551,607 apple trees in Ontario 3,456,053 of them are not yet in bearing. The same proportion holds good in most of the other fruits. Already many of our markets are glutted at certain seasons of the year, and with new orchards coming into bearing every year, the prospect will not improve unless new markets are opened up, better judgment exercised over the disposition of the crop, and better methods of handling the crop between the grower and the consumer adopted. In these directions, ample opportunity is afforded our Association to benefit the fruit growers of the Province at large in the years to come.

Premiums.

The premiums sent out from year to year by the Association have been a source of annoyance, not only to the Secretary but in many cases to the members who receive the same. Their value is questionable, for while some esteem them highly, others do not consider them worth the trouble of planting. As the money at our disposal is not sufficient to supply first-class specimens of plants or new choice varieties of fruits, we have been compelled to distribute of late years ornamentals, even these not always being first-class.

This year, I am glad to be able to report, we have received very few complaints from our members in regard to the premiums sent out. The roses supplied by Morris & Wellington were quite up to expectation, and Campbell Bros. sent out good gladiolus bulbs of Groff's well-known strains. Some of the Secretaries' reports are quoted here:—

"I beg to say the Premiums sent out by the Association are in every respect, as far as I can learn, most satisfactory."

"In regard to the bulbs sent out I may say that they were well packed, and arrived in good condition, and as far as I have heard have given satisfaction. I have heard nothing said unfavorable to them; but I have heard many speak in praise of them, so I consider they were a decided success."

"The roses were received in good condition, and so far I have not received any complaints."

"I am pleased to inform you that the bulbs arrived in good condition, being nicely packed, and as far as I have heard they have given entire satisfaction."

The question as to the advisability of continuing the sending out of these plants is one for instant consideration at the hands of the directorate. This year the Association spent $349.53 in this way and in 1903, $237.31. In previous years, the sums have been even larger: 1901, $481.11; 1900, $533.79; 1899, $560.68. The use of such a large sum of money in this way is worthy of special report to the Association while in session this year, and the matter should be settled definitely so that plans could be made a couple of years in advance. Nurserymen complain that it is almost impossible to have in stock such large numbers of plants of any one or two varieties within a year.

Local Fruit Growers' Associations.

Orchard meetings of the same general character of other years were held again this year. Below you will find a list of the five series of meetings held in different sections of the Province:—

Division 1.—Delegate, A. McNeill, Chief Fruit Division; J. L. Hilborn, Leamington.

Stoney Creek	March 14	Pelham	March 22
Grimsby	" 15	Fonthill	" 23
Beamsville	" 16	Marshville	" 24
Jordan Station	" 17	Dunnville	" 25
St Davids	" 18	Ridgeway	" 26
St. Catharines	" 19	Ancaster	" 28
Queenston	" 21	Burlington	" 29

Division 2.—Delegates, A. E. Sherrington, Walkerton; P. J. Carey, Fruit Division, Ottawa.

Olinda	March 21	Brussells	April 2
Kingsville	" 22	Lucknow	" 4
Ruthven	" 23	Kincardine	" 5
Leamington	" 24	Teeswater	" 6
Chatham	" 25	Mildmay	" 7
Exeter	" 29	Walkerton	" 8
Zurich	" 30	Arkona	" 9
Goderich	" 31	Lucan	" 11
Blyth	April 1	Port Elgin	" 12
		Tara	" 13

Division 3.—Delegate, G. C. Caston, Craighurst.

St. Vincent	March	28	Everett	April	3
Meaford	"	29	Penetanguishene	"	4
Clarksburg	"	30	Apto	"	5
Stayner	"	31	Churchill	"	6
Duntroon	April	1	Orillia	April	26-28

Division 4.—Delegates F. J. Barber, Georgetown; Mr. Scriver, Fruit Division, Ottawa.

North Williamsburg	March	24	Kemptville	March	28
Chesterville	"	25	Merrickville	"	29
Winchester	"	26	Belleville	April	2

Division 5.—Delegate, A. E. Sherrington, Walkerton.

Forest	May	3	Seaforth	May	6
Thedford	"	4	Paisley	"	7
Goderich	"	5			

In the Niagara District, combined meetings were held with the Niagara District United Fruit Growers' Association, and Messrs. McNeill and Hilborn report splendid attendance and great interest at every point. Upon request of Mr. Morris, a number of meetings were held at places in Welland, a promising district which has been somewhat neglected in the past.

The more northerly counties were visited by our Director Mr. Caston, who attended meetings in the counties of Simcoe and Grey. Messrs. Sherrington and Carey together looked after the centre and western portion of the Province, visiting the counties of Bruce, Huron, Lambton, Kent, Essex and Elgin, and held nineteen meetings. Mr. Sherrington reports that where the local advertising was well done, the meetings were well attended and great interest was shown. At some places night meetings were held where a number could be gathered together to talk over fruit matters in general. The organization of the Farmers' Institutes was called into service wherever available, but in some cases where local Fruit Growers' Associations existed, the Institute looked upon the other Associations as coming into competition with it for members, and were chary in aiding it to any great extent. Owing to this rivalry it would perhaps be as well to allow these Fruit Institutes or orchard meetings to be arranged by the Superintendent of Farmers' Institutes, and in this way overcome any local jealousy.

In the letters sent out to the fruit men in the various parts of the Province, inviting them to write for permission to hold local meetings, special mention was made of the organization of co-operative associations. Several such associations were formed, particularly in the sections visited by Mr. Sherrington. Owing to the importance of this work, your Executive decided to arrange for a special session at the time of the Annual Convention to discuss this co-operative work in 1904 and invited the representatives from the different Assocations to attend and give short addresses on some special features of their work.

Toronto National Exhibition.

To this Association is due the liberal increase in the 1904 fruit prize list of the Industrial. The members of your committee appointed in Leam-

ington a year ago spent considerable time in revising the prize list, cutting out undesirable varieties, and inserting new ones of merit. The Committee was greatly indebted to Mr. W. H. Dempsey, who spent a day in Toronto last January looking over the lists with the members of the committee. The following recommendations were made to the fruit committee of the Exhibition:—

1st. The adding of new varieties as follows:—

Apples: Bailey Sweet, Benoni, Boiken, Canada Red, Charlemoff, Chenango, Cranberry, Fallawater, Fall Jennetting, Holland Pippin, Jonathan, Kentish Fillbasket, Lawver, Louise, Milwaukee, North Western Greening, Newton Pippin, Rome Beauty, Salome, Scott's Winter, Seek-No-Further, Stark, Shiawassee, Sweet Bough, Tolman, Trenton, Wealthy, Windsor Chief. All of these were adopted except Benoni, Charlemoff, Chenango, Fall Jennetting, Jonathan, Lawver, Louise, Rome Beauty, Sweet Bough, Trenton, Wealthy and Windsor Chief.

Pears: Commice, Gifford, Lawson, Triumph. Only one, Gifford, was added.

Plums: Chabot, Glass Seedling, Hudson River Purple Egg, Italian Prune, Ogon, Red June, Saunders and Shira. Of these the first four were added.

Peaches: Chairs Choice, Champion, Globe, Niagara, Late Rare Ripe, Reeve's Favorite, these last two being cut out.

Grapes: Only one addition was asked for, viz., Woodruff, but was not added.

Quinces: Two varieties were named, Orange and Champion, and both were added.

Crabs: Six varieties were named instead of a general collection as in previous years. These were all adopted.

2nd. In addition to naming new varieties, a number of old and useless varieties were suggested to be cut off. This was done in every case.

3rd. Increases in a large number of the prizes were recommended and adopted to the extent of over $200.

4th. Twenty-three sections were asked for, prizes to be awarded to commercial packages, including the barrel and box for apples, box and basket for pears, and baskets for plums and peaches. Substantial cash prizes were suggested in each case. All of these sections were added, but the silver medal was substituted in the apple and pear sections for the cash prize, and this doubtless had some deterring effect on the entries this year.

5th. Three sections were asked for and added in the grape list for the heaviest bunch of white, black and red grapes.

6th. A special was added at our suggestion for a decorative centre piece, consisting of mixed varieties of Canadian grown fruits, varieties not necessarily named. No entries were made in this section at the 1904 exhibition, but we hope that it will be retained another year.

7th. Names of varieties such as King of Tompkins County, Souvenir du Congress, etc., were in as many cases as thought necessary, much simplified. The same rule was followed in preparing the prize lists for the present Show.

Notwithstanding the promises of the Exhibition Board in 1903, the new building for the fruit and flowers did not materialize, so that your committee were not called upon for suggestions in its planning. Further promises for 1904 have been given, and we hope to see a new building ready for the fall of 1905. Your Executive have been already asked for sugges-

tions in connection with the same. A large building is being planned to hold the exhibits of fruit, flowers, vegetables, grains and roots, with a central lecture room for demonstrations as in the present Dairy Building The building is to cost $55,000. The City Council is to be asked to submit a by-law to the ratepayers at an early date, when the question will be settled for another year.

REPORT OF INDUSTRIAL FRUIT EXHIBIT, 1904.

On entering the fruit building at the Toronto Fair this year, one was struck with the difference between this year's exhibit and that of 1903. Three of the long tables were empty, only half the space allotted to the Ontario Fruit Experiment Stations was occupied by their exhibit, and many specimens of grapes and pears in the main exhibits were undersized and spotted. Of the present season's crop in Ontario, the exhibit is in many ways fairly representative. The severe winter and cool, wet summer has had a depressing effect on the minds of many a fruit grower. The peach orchards in the western peninsula suffered severely and practically no peaches will be shipped from that section again for some years. Some of these growers, profiting by last winter's freeze-out, are going to try again. They hope that by a careful use of cover-crops, the freezing of the roots may be prevented. Many had no cover-crops whatever last fall, and as the soil in that section is very light the ground froze deeply, thus destroying the roots. In many cases the trees came out into leaf and even blossomed b t then died off.

The growers of the Niagara peach belt fared better than their western friends, losing perhaps, on an average about 10 per cent. of their trees. The crop on the orchards remaining will be of good quality and ranging from 25 to 40 per cent. of the bumper crop of 1903. The fruit is considerably later in ripening than last year, and the exhibit is hardly as attractive as usual owing to this lateness. Varieties that were fit for exhibition this time in September of last year are still small and immature.

Of course the prizes in the peach classes all go to the Niagara District, none of the western growers making any attempt to compete. Ed. Freel, of Niagara-on-the-Lake, took the bulk of the first prizes among the single varieties, with T. G. Bunting, of St. Catharanes, a close second in nearly every instance. These same names figure also in the peach collections, with Freel Bros. first and Bunting second. This is but the second year that young Bunting has exhibited at Toronto, and his success in so many of the fruits is well deserved. He is a son of Mr. W. H. Bunting, the president of the Ontario Fruit Growers' Association, and a well-known fruit grower in St. Catharines.

Apples.

The apples were, as usual, a good exhibit and for the season, very attractive. Of course, the winter varieties are still lacking full size and color, and it is a question if the apple men would not like the exhibition directors to choose dates at least a week later in order that their fruits might reach a more mature condition.

The reports from western growers present as to the condition of the apple crop are very favourable; good crops of fine clean fruit being the rule, but no buyers offering more than 60 cents on the tree. The only salvation for the growers in such sections is to organize local co-operative associations such as are at present working quite successfully at Walkerton, Goderich, and Forest.

One large grower in Halton reports about 50 per cent. of last year's crop, fruit good size and clean. Certain varieties winter killed badly and among these were some of our supposedly hardy varieties. The Baldwin specially came in for criticism from numerous growers. One orchardist from Prince Edward reported that even some of his Ben Davis were killed. All agree that the past winter was the most destructive to trees that they had experienced in many years.

In speaking of markets, one large shipper mentioned that on the whole, the Montreal market had proven the most remunerative in the many years he had shipped both east and west. The present glut in Winnipeg will be disastrous to many, and may prevent many shipments being made in that direction this fall. The fruit inspector at Winnipeg reports that the goods arriving from Ontario are good stock. However, the poor prices still hold despite the fine fruit, and many will not try the market again for some time.

The apple exhibit helped in many ways to make up for deficiencies in other fruits. The awards here were more evenly distributed than in any other class of fruit and evidently a greater interest is being taken in the apple than ever before. Harry Dempsey and J. F. Dempsey divided honors for first prizes fairly evenly, with Henry Marshall, of Hamilton, a close third. The name of Dempsey must be closely associated with the apple as besides the exhibits mentioned above, over half of the fruit shown in the Experiment Stations Exhibit bore the same name. Prince Edward has been well advertised as a good apple-growing county by the Dempsey boys.

Among the others who shared in the awards in the apple classes were S. D. Ferminger, of St. Catharines; Bunting and Merritt, of the same town; W. P. Peck, of Albury; Guthrie, and Onderdunk, of Rednerville. The latter also got second in the large collection of 40 varieties of apples, with Harry Dempsey first and Marshall, of Hamilton, third.

Plums.

All growers report a scarce crop. The exhibit is smaller than usual, but with some fairly choice specimens of both European and Japan varieties. The scale has wrought havoc in the plum orchards of the Niagara District and in the vicinity of St. Catharines has reduced the usual output by many thousands of baskets. Titterington, of St. Catharines has a heavy crop of Japans showing fine clean fruit on an orchard subject to scale. Spraying with lime-sulphur is proving the salvation of more than one fruit grower.

In the collection of plums, Robert Cameron, of Homer, won all three first, with Ferminger, of St. Catharines, second in two classes and the other honours divided between Stewart, of Homer, and Bunting and Glass, of St. Catharines. In the plate exhibits, the same names are prominent with Ferminger leading in most varieties.

Pears.

Pears are about up to the average. The crop is later by a week at least than last year, resulting, in some varieties, in undersized fruit. Bartletts are reported to be a good crop. Much fire blight is mentioned as occurring in the Grimsby section.

The competition in the pear classes while keen, was confined to about six large exhibitors. Ferminger, of St. Catharines, carried off most of the firsts with Marshall, of Hamilton, second in honours and Bunting and Glass, of St.

Catharines and Pillow, of Canandaigua, N.Y., dividing the remainder. G. H. Wild, of Hamilton also succeeded in getting a number of firsts and won second in the collection of fifteen varieties.

Grapes.

These are again an attractive exhibit though in many cases, owing to the late season, the berries are green and the bunches irregular. All the growers report a splendid crop despite the inroads of the black rot which has destroyed from 10 to 25 per cent. of the fruit, especially of the Niagara variety. The Ontario Department of Agriculture is now at work on this troublesome disease, and it is expected that next year the growers will have more information at their command and be able to hold it in check. Speaking to a number of grape growers on Tuesday, Prof. Macoun, of the C. E. F., Ottawa, said that the damage is done early in the season from the spores which have lived through the winter, and which attack the young growing shoots early in the season. The first sprayings with 3 or 4 lbs. copper sulphate to the barrel are the most important. The aim should be to prevent the spores from securing an entrance to the young tissues from whence they spread inside to the fruit and leaves.

F. G. Stewart, of Homer, swept the lists in the grape exhibits, winning first in the three collections and in over a dozen of the single varieties. Ferminger and Broderick, of St. Catharines, also did well, while John Chambers, of Toronto, won most of the firsts for grapes grown under glass. The first prize for the variety, Winchell (Green Mountain), was awarded to W. M. Robson, of Lindsay, rather a peculiar matter, considering the section in which they were grown.

Special Exhibits.

Only one entry was made for the best display of fruits from any association or institute and this was made under the name of A. D. Broderick, of St. Catharines.

Under the Fruit Experimental Station Exhibit, which was in charge of A. M. Smith, of St. Catharines, was displayed a number of varieties of apples from Harold Jones, of Maitland, Dempsey of Trenton, and apples and pears from Peart, of Burlington. Jones' specialties, the Fameuse class, were shown to good advantage in the varieties, Brockville Beauty, Snow (Fameuse), McIntosh and Scarlet Pippin. The St. Lawrence Valley certainly can excel in this type.

Dempsey showed some fine Spy, Alexander, Trenton, Duchess and others. Peart made a good show of pears, including all the old favourites. His Duchess, Astrachan and Sweet Bough apples were also fine specimens. A novel fruit was a plate of Japan walnuts, grown by Mr. A. M. Smith, in St. Catharines, and fruited for the second time since planting.

Packages.

Probably the best features in the fruit department are the classes for fruit in packages ready for the market or for export. These include both barrel, box and basket packages, with special specification, 10 by 11 by 20 in. for the box. This is the standard size adopted last year by the British Columbia, Ontario and Nova Scotia Fruit Growers' Associations. The competition this year was not keen, honours being divided about equally be-

tween Bunting, of St. Catharines, and Stewart, of Homer. The barrel class was not touched as the award, silver medal, would hardly pay for the work entailed in getting up an exhibit.

The judge in these classes, Mr. Alex. McNeill, Chief of the Fruit Division, Ottawa, made some interesting remarks in giving his awards. Some of the boxes shown were, he considered, packed hardly high enough and should have been coned somewhat toward the middle of the face, so that an even pressure would come on all parts of the contents. The arrangement of the apples will depend on their size, some packers facing stem up, others showing the sides. In making the award on the pears in baskets, the medal was given to Stewart, of Homer, who showed the 11 qt. basket with the ordinary frame cover. The other package entered was packed high with fruit and the leno sewn on. While in appearance the latter was preferable, still it could not be shipped to advantage in that form and was therefore ruled out. This educative feature of the exhibition was extremely interesting to the practical growers present, and the Ontario Fruit Growers' Association intend to make this one of the main features of their big show at the Granite Rink, Toronto, in November.

Horticultural Societies.

As you will notice by the programme prepared for the week, the question of forming a Provincial Association of Horticultural Societies has already been discussed by representatives from nearly all the Societies in the Province. Several years ago, the Fruit Growers' Association feeling that the Horticultural Societies were in many cases not doing the work they were expected to do when organized, decided to render them all the assistance in their power. With this object in view, your Executive prepared a set of rules for those Societies that desired to amalgamate with the Association. Under these rules, the Provincial Association promised to send once a year, a competent lecturer to address the members of each Society upon some horticultural topic, the travelling expenses of the lecturer to be paid by the Provincial Association, while the local Society was to entertain him while in their midst. Further, members of the affiliated Societies were to receive the Canadian Horticulturist, the annual report of the Fruit Growers' Association, and the yearly premiums distributed to its members. In return, this was to cost the members of the affiliated Societies 80c per member. Many of the Societies accepted this offer up to the year 1902, with the result that there was a great awakening among their officers and members, who were stirred up by the enthusiasm of such lecturers as Thos. Beall, Jas. Scaff, T. H. Race, Wm. Hunt, A. M. Smith and others.

The work as carried on in former years was continued in March and April of this year. Below will be found a list of the meetings as arranged:

Division 1.—Delegate: Wm. Hunt, O. A. C., Guelph.

Cardinal	March 16	Lindsay	March 22
Picton	" 17	Midland	" 24
Stirling	" 18	Clarksburg	" 25
Millbrook	" 21	Owen Sound	" 29

Division 2.—Delegate: T. H. Race, Mitchell.

Hespeler	March 15	Kincardine	March 30
Port Dover	" 21	Tillsonburg	" 30
Simcoe	" 22	Newmarket	" 6
Cayuga	" 23	Elora	" 7
St. Catharines	" 24	Seaforth	" 8
Grimsby	" 25	Strathroy	April 11
Niagara Falls	" 28	Woodstock	" 12
Aylmer	" 29	Elmira	" 15
		Walkerton	May 3

The reports as sent in by Mr. T. H. Race and Mr. Hunt evidenced great activity in the majority of Societies. Wherever the offices were held by competent and interested men, the Societies as a whole were accomplishing much in the way of improving not only the private grounds and residences of the cities and towns, but also the public buildings, streets and parks. I have attached below Mr. Hunt's report on the Societies he visited and the work he suggested they should take up during 1904. Many of these plans have since been carried out, and at a large number of places the Societies held Floral Exhibitions, where the main feature was the exhibits of plants grown from seed distributed by the Society in the Spring, not only to members of the Association, but to school children and others.

Owing to the many questions of importance arising in connection with the Horticultural Societies, it has been felt desirable that they should follow the example of the Agricultural Societies and form a separate Provincial Association, with the object of being better able to decide upon these important questions. Just what bearing this will have upon the relation between our Association and those Societies that were affiliated with us, it would be well to discuss at this time.

It is likely that many of the Societies will cease to affiliate with your Association. The arrangement of lecturers will be conducted through the new Association and the Societies will naturally look upon it as the parent Society. The sending of the Horticulturist to all affiliated members will rest upon the price at which the paper will be offered by an independent Company to both Horticultural Societies and your Association. Many of the Societies object strongly now to the rate of 80c per member, but your Association could hardly reduce the rate unless receiving the paper at a much lower rate from the publishing Company.

Association Before Railway Commission.

Under this heading I mean to touch but briefly on the appearance before the Railway Commission of the representatives of your Association. A full report of the excellent showing they made there will be given tomorrow morning by the Chairman of the Transportation Committee. When the Commission acceded to the request of Mr. W. L. Smith to appear in Toronto to hear the grievances of the Fruit Growers, your Executive was urged to bring as strong a deputation of fruit men to Toronto as possible. Owing to the financial state of the Association, it was found impossible to bring as many here as desired. Fortunately, however, the men selected by the Committee made out a clear case against the railways in so many instances that the Commission took a most favorable view of their case, with the result that many of the complaints of the Fruit Growers were remedied. Mr. W. H. Gregory, a lawyer who had given a great deal of time to the

consideration of questions of this nature, was retained by the several Associations to act as legal adviser. The total cost to the Association only amounted to $20.00, which sum would be saved in sending a single car of mixed fruits to the Northwest under the new rates as enforced by the commission.

There are still many vexatious questions to be settled, and the Association should select as strong a committee as possible for the coming year, giving them full license to spend whatever sums are necessary to the proper carrying on of the work.

Canadian Horticulturist.

Several important changes have been made in the management of the official organ of the Association during the year. At the last annual meeting Mr. Creelman made some suggestions along this line, and intimated that he would be able to secure the services of a first-class newspaper man with a wide experience at a reasonable figure to the Association. This matter was therefore left in the hands of your Executive to decide as they should see fit during the year. The gentleman to whom I refer, Mr. H. B. Cowan, met your Executive in January, and again in February at the time of the meeting of the Fairs Association. At the later date, owing to Mr. Creelman accepting the offer of the Presidency of the O.A.C., the way was opened to bring Mr. Cowan to Toronto. He was appointed to the position of Superintendent of Fairs and Exhibitions, and by your Executive as business manager of the *Horticulturist*, which latter position he took up on the 22nd of March. Mr. Cowan has devoted much of his time and energy to that date to working up the advertising and improving the matter contained in the paper. His success has been notable, especially in the advertising, a question which has troubled your Executive a great deal in the past. No great departures have been made in the general appearance, magazine form, etc. of the paper, owing largely to the cost. Owing, also, to the season when Mr. Cowan took charge very little could be done in the way of increasing the circulation, a very vital question in the life of every Magazine.

In the financial statement which I have placed in your hands, you will notice that I have certain accounts which run only to May, and are then placed under the one heading of *Horticulturist*. These are commission, advertising, fees, etc. After that date Mr. Cowan kept separate books for the *Horticulturist* and paid all accounts in connection with the same except that of printing. He turned over to me during October and November the balances he had on hand with which to pay for the printing of the Magazine.

Shipments to Winnipeg.

I mention these shipments here because many of the members of your Association were interested in the fruit sent out in the cars from Grimsby and St. Catharines. Your Secretary was present at both places, and observed the condition of the fruit on arrival at the stations, method of packing the fruit, arrangement of packages in the cars, etc. Owing to the unsatisfactory condition of the trade in the west for Ontario fruit, the Ontario Department of Agriculture felt that special investigation was necessary into the condition at both ends and also in transit. Prof. Reynolds was detailed for this work, and has already given a brief report of this in the

Horticulturist. It has been deemed sufficiently important, however, that Prof. Reynolds has been asked to report verbally, and at greater length before the Association on Thursday afternoon.

This question of improving our western market is one of very great importance to the Ontario fruit grower. The population of the country from North Bay west to the mountains and north as far as habitable has already increased a hundred fold in a few years, and with the building of a second transcontinental railway and the consequent opening up of new territory to the settler, the market there will be more valuable than the home market in Ontario. The westerner buys liberally and always of the best. The last fact is significant. One agent, representing large interests among British Columbia fruit growers, stated to me that of over four hundred retailers he had visited in Manitoba and the territories this year, not one had asked for a lower grade of apples than No. 1 or xxx.

British Columbia and the Western States are making great efforts to capture this valuable market, and believe they have already succeeded in doing so. Their fruit is better packed, and arrives in finer condition than the Ontario fruit. This is largely due to the use of more suitable packages. Much of our Ontario fruit is shipped in flimsy baskets, piled high in the cars and close together for support, with the result that the fruit is bruised and squeezed by the packages and heated by the close packing. Dealers in the west have complained to such a great extent that Ontario fruit as a whole has a bad reputation there, and the Department of Agriculture felt it a necessity to investigate the matter at once. Your Executive feel that the matter should not be allowed to drop, but that further efforts should be put forth along the same lines either by the Department in co-operation with the association or by the Association itself. The incoming Directorate should make it a matter for discussion before dispersing for the year, and take some action in regard to it.

Annual Report.

We have again to report that the fates were against the early issue of the annual report of the Association. The matter was in shape and in the hands of the printers before the end of March. The galley and page proof had been read and corrected by the Secretary, and the plates were all at the press, when they were destroyed by the big fire in the wholesale district of Toronto on the night of April 19th. The whole matter had to be reset, and the proof read again, with the result that the report only reached the Department for distribution in October.

The bound volumes of the *Horticulturist* sent out to the Directors suffered also in the same fire. Over 60 volumes were destroyed at the binders, along with the expensive plate for the cover. Some difficulty was experienced in replacing these volumes, and a great deal of annoyance was caused to members who had sent in their numbers early in the year to be bound. A second fire in the same company's premises during the summer delayed matters, though the volumes were fortunately saved. They finally reached the Secretary's office last week, and the Directors will receive their copies at an early date.

Fruit Exhibition. Preparation of Prize List. etc.,

When your Secretary at Leamington brought up the matter of a fruit show in Toronto in connection with the annual meeting of the Association,

it was left with the Executive to adopt any measures they might think necessary and communicate with the Directors by letter. A joint meeting of the fruit, flower, and honey representatives was finally arranged for, and your Association was represented by W. H. Bunting, A. McNeill, Jas. Scarff, Murray Pettit, Wm. Rickard, W. L. McKinnon, and the Secretary. The results of the meeting were made known to the Directors by letter and through the *Horticulturist*. A meeting of the fruit representatives was held earlier at which the estimate of expenses previously drawn up was thoroughly discussed and agreed upon. Two committees were appointed, one consisting of Messrs. Bunting, Dawson,, White, Collinson, and the Secretary to solicit subscriptions towards the prize list, and the other consisting of Messrs. McNeill, M. Pettit, Cowan and the Secretary to prepare the prize list. This soliciting committee met in July and interviewed a number of the fruit commission merchants, express companies, and two of the steamboat companies, and secured $96 towards the prize lists. The Prize List Committee met at the Secretary's office and drew up a draft prize list based largely on Mr. W. L. McKinnon's classification. This preliminary prize list was submitted to the Directors, and from their suggestions, as far as the finances of the Association would allow, the final prize list was arranged. A few necessary changes were afterwards made by the Secretary, and a set of rules for the guidance of exhibitors were drawn up. Several meetings of the Executive were held during the summer to discuss questions of importance arising in connection with the exhibition. The matter of paying transportation charges on all exhibits was finally settled by adopting the rule that all prize fruit should become the property of the Association. By the sale of this fruit, it is hoped that the Association will be repaid to a certain extent for the cost of transporting exhibits.

Several meetings of the general committee were held from time to time at which a great number of details were finally settled and committees were appointed. Your Secretary succeeded in getting from the advertising committee nine pages of advertising space at a slight advance of the cost. Four of these pages were used in giving advertising notices to those who contributed towards the prizes, while the remaining five were sold at the regular rates and netted the Association a considerable sum.

At the suggestion of Mr. Cowan a joint programme was issued with the Bee-Keeper's Association, the Fruit Growers' Association and the proposed Association of Horticultural Societies. Though the individuality of the Association was thus decreased, it was felt better in every way to combine to save expense. The holding of the meetings away from the show was thought to be detrimental to the attendance at both, but it was rendered necessary by a lack of a suitable room in either of the buildings chosen for the show.

The prize list was late in being sent out, with the result that many of the earlier varieties of apples and pears had been packed and shipped by those who might have exhibited. As a whole, however, the classes have been fairly well filled and some 240 entries were received.

The Secretary, in commenting on the Show, said they were very much disappointed in the exhibits of implements, as they could not get the firms who manufactured implements to make a display with them, but as far as the exhibits of fruit were concerned he thought they were to be congratulated.

Alex. McNeill moved that the Secretary's report be received for discussion, and in doing so said he wished to bear testimony to the hard work done by the officials this year. Continuing, he said: "I would like to say this report of our Secretary furnishes food for thought. We have not yet achieved our ideal and in many things fallen short, as an executive, and much work planned last year has been touched but gingerly. I think, however, we have done everything that could be expected, but there is much yet to be done. I was particularly sorry even more had not been accomplished with reference to the co-operative associations. I was very sorry indeed one or two other things could not be done, but I think on the whole we have reason to be congratulated."

Mr. G. C. Caston. I am well pleased with the success that has attended our effort in holding the Show, and hope we would be able to make this a permanent exhibition somewhat along the lines of the Winter Fair at Guelph.

On motion of Alex. McNeill, seconded by A. M. Smith, the Secretary's Report was adopted.

TREASURER'S REPORT, 1903-4.

Receipts.		Expenditures.	
Bal. on hand Dec. 1, 1903	$642 36	Canadian Horticulturist	$2,492 18
Members' fees	1,236 24	Salaries	976 54
Government grant	1,800 00	Annual Meeting	372 65
Advertising	144 82	Commission	22 25
Binding	3 30	Auditing	7 75
Books	32 63	Committees	200 94
Miscellaneous—		Binding	5 60
Annual Meeting	44 67	Printing and Stationery	98 20
Horticulturist	1,490 99	Books	42 78
Commission	3 75	Premiums	349 53
Prize List, etc.	123 15	Miscellaneous	148 10
Sundries	97 00	Exchange	3 80
		Prize List	45 00
		Balance	853 59
	$5,618 91		$5,618 91

Details of Expenditures.

Canadian Horticulturist:—Grip, Limited, $11.88; Globe Printing Co., $1; Postage, Wm. Forbes, $3.15; Grip, $26.88; Advocate, $1.50; L Woolverton, $8; incidentals, $10; J. Buchanan, 75c.; Brown Bros., $7; Wm. Weld, 75c.; W. T. Murray, $2; H. B. Cowan, $5; F. T. Shutt, $2.50; Bryant Press, $1.25; F. Hurndall, $2; L. Woolverton, $12.95; Grip, $45.57; H. B. Cowan, $10; J. Robertson, $1.35; Spectator Printing Co., $988.32; Grip, $72.39; H. B. Cowan, $25; C. B. Morse, $9; Spectator, 1,038.60; Spectator, $205.34 ..... $2,492 18

Salaries:—G. C. Creelman, $83.32; H. B. Cowan, $284.91; P. W. Hodgetts, $150; L. Woolverton, $458.31 ..... $976 54

Annual Meeting:—G. C. Creelman, $75; A. M. Smith, $15.75; J. S. Scarff, $12.50; T. H. Race, $14.90; Wm. Rickard, $10; A. B. Cutting, $9.70; W. H. Owen, $11.50; G. T. R., 65c.; J. L. Hilborn, $3.95; L. R. Taft, $11.05; R. B. Whyte, $32.20; A. K. Goodman, $13.35; E. Morris, $14.70; Thos. Beall, $21.70; Elmer Lick, $18.80; W. H. Bunting, $15.90; Annual Meeting, $24.70; A. McNeill, $2.55; M. Pettitt, $13.75; W. B. Varley (reporting), $50 ..... $372 65

DETAILS OF EXPENDITURE—*Continued.*

Commissions:—W. T. Murray, $22.75; P. W. Hodgetts,, $2.50		$25 25
Auditing:—J. M. Duff		$7 75
Committees:—T. H. Race, $7.50; W. H. Bunting, $20; W. H. Bunting, $1.85; W. H. Dempsey, $6.95; W. H. Bunting, $30; H. B. Cowan, $37.04; J. L. Hilborn, $6; T. H. Race, $6.05; R. J. Graham, $26.75; W. H. Bunting, $48.45; Jas. Scarff, $6.85; M. Pettit, $3.50		$200 94
Binding:—Brown Bros.		$5 60
Postage, Printing and Stationery:—Postage from Cash, $17.20; Postage for Office, $81		$98 20
Books:—Wm. Briggs, January, $11.69; May, $28.77; October, $2.32		$42 78
Premiums:—(Durham), $1.50; Campbell Bros., $78.78; R. Evans & Co., $37.96; Morris & Wellington, $231.29		$349 53
Exchange		$3 80
Printing Prize List		$45 00
Miscellaneous:—March sundries—H. B. Cowan, $50; May—C. B. Morse, $48; June—C. B. Morse, $36; July—C. B. Morse, $12; November—P. W. Hodgetts, $2.10		$148 10

Examined and found correct this 12th day of November, 1904.

(Signed) J. M. DUFF,
Auditor.

Mr. WOOLVERTON wished to know how it was members' fees were only $1,236.24. Mr. Hodgetts explained that after the first of May any members' fees that came in were handed over to Mr. Cowan, and he presents in his report a full statement of what came in after that date.

Mr. ELMER LICK asked how many members there were altogether, and Mr. Cowan said they had a membership of 4,064.

Mr. WOOLVERTON asked if the receipts for books were for bound copies, and the Treasurer stated the binding was separate, and the books were those sold through the list in the *Horticulturist*. The Treasurer further explained that under the heading of "Miscellaneous" there was an item on the first of March, H. B. Cowan, $50. This was an arrangement made by the Deputy Minister whereby Mr. Cowan's expenses were paid to the Fairs' Association last year by the Association and repaid to the Association by the Government. Mr. Cowan has arranged for this amount to be returned to us.

Moved by R. B. Whyte, seconded by G. C. Caston, "That the Treasurer's Report be adopted, as explained." Carried.

REPORT OF BUSINESS MANAGER OF "THE CANADIAN HORTICULTURIST".

BY H. B. COWAN, TORONTO.

When in March last I assumed the business and editorial management of *The Canadian Horticulturist*, my instructions were positive and

definite. The subscription and advertising departments were to be placed on a business basis. Everything possible was to be done to improve the reading columns and general make up of the magazine.

It is customary, when a paper is to be improved, for the management to set aside a considerable sum for that purpose. This was not done in the case of *The Horticulturist*. All money spent on the magazine, I was given to understand, must first be made. This will account for the fact that while the value of the advertisements during the past seven months has greatly increased, the expenses, also, have been greater than usual. Most of this expenditure, however, has been of an extraordinary nature, and need not be incurred another year.

The first step taken was to make a thorough canvass of the situation. The business management, from a newspaper standpoint, was found to be weak. Although *The Horticulturist* had been published for twenty-six years, a great majority of Canadian advertisers had practically never heard of the magazine. There was no neat, attractive schedule of advertising rates. The only schedule was simply a typewritten statement, and was incomplete. The rates, in spite of the small circulation of *The Horticulturist*, were double and treble the rates charged by such papers as the *Farming World* and *Farmers' Advocate*. Different rates were charged different advertisers.

In the April issue there were slightly over two pages of poor advertisements. The effect was to lower the tone of the publication, and to injure the trade of legitimate advertisers. The system of entering advertising accounts and of billing advertisers was incomplete.

In the subscription department no alphabetical list was kept of subscribers, and the dates on which their subscriptions were received. This made it difficult to keep close track of subscriptions, and resulted in a considerable number of names being duplicated on the mailing list, while others were continued in some cases for months after they should have been cut off.

Improvements Made.

The advertising department was first taken in hand. Renewal contracts were refused all firms offering advertisements of a questionable nature. This action considerably reduced the advertising revenue, but it was felt such a step would meet the approval of the Directors of the Fruit Growers' Association.

The advertising rates were reduced, and sample copies of *The Horticulturist* were sent to several hundred likely advertisers, with letters soliciting their business. In June, Mr. A. J. Hand, a student of the Guelph College, was secured as advertising manager, and retained until September 15. During the summer months, Mr. Hand canvassed for advertisements in the leading cities and towns of Ontario, and also in Montreal, Que. While the expense was heavy, the results justified the outlay. Signed contracts were secured for nearly $500 worth of advertising; Mr. Hand's salary and expenses amounting to $184.20. Further results from this work are expected. It was found that many firms had contracted for their advertising for the year. A number of these firms promised to sign contracts in December for next year's advertising, while others invited our representative to call again. A marked increase in advertisements is, therefore, anticipated in the near future.

This work made it possible to thoroughly revise the advertising rates. A neat, little advertising folder was issued. A liberal supply was order-

ed, which means that this expense need not be incurred again in the immediate future.

New Advertising Books.

A new set of advertising books was purchased at a total expense of $28.92. These include a petty and regular cash book. In a combination ledger and billing book, an account is kept with all firms and societies doing business with *The Horticulturist*. There is also kept an account for printing, illustrations and miscellaneous expenses. Advertisers are billed at the expiration of their contracts, or quarterly. It is thus possible to ascertain at any time the exact financial standing of *The Horticulturist*. Directors of the Fruit Growers' Association are invited to examine these books.

As a means of improving the system of handling subscriptions, a four-drawer card index was purchased, costing $24.50. By this system cards may be utilized for five years in keeping track of all subscriptions, there being a card for each subscriber. On each card is entered the name and address of the subscriber, the time the subscription begins and expires, when the money for the same was received, commissions, if any, etc. As subscriptions are received they are daily entered in the petty cash book, the necessary additions or changes made in the mailing list, and a card written and placed in the drawer. These cards are not entered until the money has been received. They are then filed alphabetically. In this way, the petty cash book, mailing list and card system should correspond, making it possible to keep careful track of every subscription. A careful inspection of this system is invited.

The results of the various changes outlined are shown by the returns already received. In 1902, the advertisements in *The Horticulturist* for the year amounted to $283.65, a monthly average for the year of $23.65. In 1903, the total receipts from advertising amounted to $535.71, a monthly average of $44.50. The advertising in the seven issues of *The Horticulturist* since April has totalled $691.52, an average of $98.79. In addition to this, extra copies of *The Horticulturist* have been ordered by advertisers to the value of $126. As a profit has been made on these papers, they might be included in the total returns received from advertising, in which case the total receipts would be $817.52, or a monthly average of $116.79.

The Editorial Management.

Many changes were made in the editorial management. Some of the chief defects are worth noting. 1st. Previous to May, *The Horticulturist* was published very irregularly, often not appearing until the second week of the month. 2nd. Typographical errors were so numerous as to be a matter of general comment. 3rd. Copy had to be in the hands of the printer by the 15th of each month. This meant that a great deal of matter appearing in *The Horticulturist* was old when it reached subscribers. 4th. The number of contributors was small. 5th. There were no regular departments for different subjects. A general feeling seemed to exist that *The Horticulturist* only represented a limited section of the Province. 6th. Too little attention was devoted to flowers, and the proceedings of horticultural societies. An analysis, made in May, of the circulation of *The Horticulturist*, showed that approximately three-quarters of the readers of *The Horticulturist* were members of horticultural societies, and conse-

quently but little interested in fruit growing. It was found that a number of the societies had discontinued taking *The Horticulturist*, owing to the fact that so little attention had been given to these subjects. This meant a large reduction in circulation.

The first change made was to arrange with the printers to accept matter for *The Horticulturist* until the 25th of each month. Extremely important news can be accepted as late as the 27th of each month. The publishers were given plainly to understand that the magazine must be printed and mailed the last day of each month. During the first three months, while there was a great improvement, it was found difficult to insure the publication of the magazine promptly, but since July *The Horticulturist* has appeared regularly on the first of every month. These two changes mean that *The Horticulturist* each month contains fresh news for its readers.

To avoid typographical errors, galley proofs of all matter are first read, and later, I or my assistant visit the office and read all page proofs. This, while costing considerable, has reduced the number of these errors to a minimum.

The number of contributions was greatly increased. Articles and notes from as many as 300 fruit growers and florists have appeared in one issue. This has added greatly to the interest taken in *The Horticulturist*. Regular departments were established for general horticulture, orchard, small fruits, vegetable growing, flowers, commercial fruit growing, crop reports, society doings, and two regular pages were reserved for editorials. While the various departments have appeared to meet with general approval, judging from the large number of letters received from subscribers and advertisers, they fall far short of what such departments should be.

Arrangements require to be made to secure more articles on fruit and flowers from well-known authorities. The vegetable and small fruits departments are particularly weak. A great improvement should be made in the crop reports. Those published during the past summer have been very incomplete. One man should devote a considerable portion of his time to preparing these reports, and should carry them on carefully from month to month.

A number of matters, connected with *The Horticulturist* call for careful consideration. Although called "*The Canadian*" *Horticulturist*, the magazine practically only represents the horticultural interests of Ontario. The fruit growers and florists of other Provinces are calling for a magazine in which they also will have an interest. To meet that demand, *The Horticulturist* should be enlarged, and departments added for the leading fruit producing Provinces.

If the magazine is ever to pay its way, an advertising manager should be engaged permanently. The paid circulation does not much exceed 4,300. This is too small to ensure advertisers obtaining satisfactory results. A determined effort is required to increase the circulation. In this connection the advisability of dropping the subscription price from one dollar a year to sixty cents a year, or two years for one dollar should be carefully considered. The *Farming World* is offered to subscribers for sixty cents a year, or two years for one dollar. The *Canadian Poultry Review* (circulation over 9,000) is only fifty cents a year, three years for one dollar. This magazine, on account of its large circulation, is able to charge much higher advertising rates than *The Horticulturist*. In the United States, the four leading fruit papers, *The National Fruit Grower*, *The Western Fruit Grower*, *The Southern Fruit Grower*, and *American Fruits*

are each only fifty cents a year and some of them offer to accept four new subscriptions and a renewal for one dollar. Published only monthly, as it is, there seems to be little chance of increasing the circulation of *The Horticulturist* among fruit growers as long as the subscription price is continued at one dollar a year.

There are a number of other important matters that deserve careful consideration, including the necessity of an improvement in the cover, the addition of a story page and household department, a change in the method now followed by horticultural societies in settling for their subscriptions, the desirability of a more frequent publication, etc.

The fundamental weakness in the management of *The Horticulturist* lies in the fact that the officers of the Fruit Growers' Association are not directly interested financially in its success. The magazine on this account, is not given the close and careful oversight it requires. If *The Horticulturist* is to be enlarged, as seems desirable, the staff will have to be strengthened and the expenditures increased. In such a case the weakness just mentioned would become all the more apparent.

Since May 1, the expenses and receipts of *The Horticulturist* have been as follows:—

Total receipts		$2,141 23
Given secretary F. G. Association	$1,318 60	
Given secretary on account back advertisement	37 49	
Travelling expenses	62 85	
Office Supplies	52 42	
Editorial expenses	21 27	
Advertising man's salary and commission	184 20	
Stationery and printing	71 25	
Cuts used since May	158 56	
Advertising commission	8 10	
Subscription commission	21 10	
Incidentals	15 00	
Sundries	24 40	
	$1,975 24	
		$2,141 23
		1,975 24
Cash on hand		$165 99

(Signed) H. B. Cowan.

Moved by J. S. Scarff, seconded by M. Petitt, "That the report of the Business Manager of *The Canadian Horticulturist* be received and adopted."

Mr. Scarff complimented Mr. Cowan on the creditable report.

Mr. Whyte thought they should give *The Horticulturist* to societies at a much less rate than eighty cents.

G. C. Caston said they had been giving membership to the Association, a premium and report all for $1.00, or 80 cents to societies.

Mr. Jas. Scarff stated he had been Secretary of the Horticultural Society of Woodstock for twenty years, and had never received a complaint from any person that the amount was too large.

Mr. G. C. Caston: Would it not be a good scheme to have the magazine taken over by a company, and out of the hands of the Society altogether?

On motion of A. E. Sherrington, seconded by Thos. Beall, it was resolved: "That the present session of the directors adjourn and meet again at 7.30 p.m."

EVENING SESSION.

The Secretary read a communication from Mr. L. Woolverton, Editor of *The Canadian Horticulturist*, tendering his resignation.

The majority of the members of the Board expressed their appreciation of the valuable services Mr. Woolverton had rendered the Fruit Growers' through the magazine, during the past seventeen years and the following resolution was then unanimously passed.

Moved by W. T. Macoun, seconded by G. C. Caston, "That we, the Board of Directors of the Fruit Growers' Association of Ontario, accept the resignation of Mr. L. Woolverton as Editor of *The Canadian Horticulturist*, and desire to tender our appreciation of the very valuable work done by him in promoting the fruit industry in the Province of Ontario." Carried.

The President said he thought Mr. Cowan had some further statements to make in reference to probably more satisfactory and successful methods of publishing *The Canadian Horticulturist*, and called upon him to address the Board.

Mr. Cowan repeated some of his statements of the afternoon in reference to the management of *The Horticulturist* in the past and stated that after some thought on the matter he had come to the conclusion that the paper would, if continued and improved as he purposed doing, become too large a business proposition to be handled by the Association. Acting upon this belief, he had consulted with the Executive, and finally with the Directors, in reference to organizing a stock company of fruit and flower growers to take over the paper altogether from the Association. With their consent, he had issued a prospectus, and in three weeks the stock of $10,000 was subscribed. After explaining the matter further, Mr. Cowan stated that further action rested with the Directors.

The PRESIDENT: The Board would be interested to know as to where the Association would come in, in connection with this.

Mr. COWAN: It came up, what would the Fruit Growers' Association be entitled to if this company were formed? It was felt the Fruit Growers' Association were entitled to receive something. It was thought that the company would give the Association $1,000 stock, and reserve another $1,000 stock for the Association to purchase if they saw fit, that would give the Association one-fifth of the stock and practically insure the President of the Fruit Growers' Association being a director of the company.

Mr. CASTON: What arrangements would be made with regard to the membership and the Journal? Would the payment of $1 membership still entitle a member to the Journal?

Mr. COWAN: I presume an arrangement could be made the same as with the *Ottawa Valley Journal*. The membership fee to the Eastern Dairymen's Association is $1. We agreed to send every member of the Dairymen's Association the Journal for a year on payment of 50 cents subscription.

Mr. CASTON: A person would require to pay $1.50?

Mr. COWAN: No. The Association paid 50 cents to *The Journal* and kept 50 cents themselves. The magazine would still be the official organ of the Fruit Growers' Association.

Mr. LICK wished to know if members of the Association would get *The Horticulturist* for sixty cents, and Mr. Cowan informed him if the price was reduced to sixty cents to everybody, then it would be fifty cents to clubs.

The PRESIDENT: Is there any gentleman here who can give us the details under which members are received into the New York Fruit Growers' Association, and what advantages there are, and whether they get any Government grant?

Mr. WOOLVERTON said the fee was $1. There was no Government grant, and all a member got was a copy of the report, and the privilege of attending the annual meeting, and they are not allowed to enter the hall at the annual meeting without producing a ticket and showing they are members.

The PRESIDENT stated he had made some inquiries, and found they had two classes of members—those who paid $1. and those who paid $3. The three dollar members received, in addition to what Mr. Woolverton already stated, confidential reports upon the condition of the crops, not only in New York State, but in the various States of the Union. In addition to this they have a Bureau for the distribution of chemicals, etc., at cost price to members who pay the larger fee. The President was also of the opinion that under the new arrangement it would perhaps be better to give the members more than the fifty cent subscription to *The Horticulturist* for their $1. He felt for some time past they should get an accurate knowledge of the condition of the trade and fruit industry of the country. They had no definite knowledge of the acreage of fruit, etc., and some times the reports are to a certain extent misleading. He said the Fruit Division at Ottawa was making an effort to secure some such information every year, but, perhaps, they were not able to get it as accurate as it might be.

Mr. ALEX. MCNEILL informed the Board that they were trying to make that matter as nearly perfect as could be, as they had a great many correspondents throughtout the country collecting information regarding the fruit crop, and he hoped to be in a position to give very accurate accounts.

In speaking further in regard to *The Horticulturist* Mr. Cowan said if the present scheme went through he would engage an associate, also an advertising man, and they would have an office down town. He would look after the greater part of the editorials, and do the general planning, and would retain his connection with the paper, representing the Fruit Growers' Association. One question which he wished to give his special attention to was the reduction in price, and he also thought it might be advisable to publish it twice monthly and in that case they would require a number of special features. He did not think there would be any danger in lowering the tone or quality of the paper.

It was then moved by E. Morris, seconded by G. C. Caston, "That the President, W. H. Dempsey, and Elmer Lick, be a committee to report on Mr. Cowan's proposition to the new Board of Directors." Carried.

DIRECTORS' MEETING.

The newly-elected Board of Directors met at the Parliament Buildings on Thursday evening at 8 o'clock. President McNeill took the chair.

Considerable discussion took place on the relation between the Horticultural Societies, local Fruit Growers' Associations and the Provincial Association, and the following committee was appointed to look after the matter: Messrs. Sherrington, Lick, Putnam, Cowan and McNeill.

The special committee appointed by the old Board to report on the scheme to form a separate company to publish *The Horticulturist* reported as follows:—

"Your committee to whom was referred the proposition looking to the handing over of *The Horticulturist* to a stock company, report that they would recommend—

1. That the full approval of the Board of Directors be given to the proposition.

2. That the offer of $1,000 in paid up stock for the good will of the paper be accepted.

3. That the Board take $1,000 stock in the new company.

4. That a committee of three be appointed to work out the details in conjunction with the stock company with full power to act in this matter as they deem best.

The report of this committee was adopted with the recommendation that the matter be taken up next day in open meeting of the Association so that the members could endorse the action of the Board.

On motion of Mr. Scarff, seconded by Mr. Lick, Messrs. McNeill, Bunting and Hodgetts were appointed a committee to work out the details of the above proposition.

After the appointment of delegates to the various fair boards and kindred associations (see page 1) the Board of Directors adjourned.

MY TOUR AMONGST OUR SOCIETIES.

By Wm. Hunt, O. A. C., Guelph.

Thinking that the several thousand members of our Association would possibly like to hear a little about my recent lecture tour to some of our societies in the far eastern and northern parts of the Province, I will endeavor to give a brief resume of my trip.

I reached the pretty little village of Cardinal, Grenville County, early in the morning of the 16th of March, having travelled all night so as to be there by the early train, that I might be able to address the public school scholars in the afternoon, having been requested previously by letter from the President of the Society, Dr. Gow, to try and reach there in time to address the young people. This I was only too willing to do, for I have for many years past advocated the desirability of interesting as much as possible our young people in their love for plants and flowers; and not only interest them by talking to them of the many beauties of the floral world, but also give them something to do and carry out themselves, thereby creating an interest far more enduring in its character than the most flowery-worded address that could possibly be given them. With this end in view, I at once broached the idea to Dr. Gow of the Society making a distribution of seeds or plants to the older children of the school. Dr. Gow fell in at once with the idea, and before 3 p.m., the hour I was to meet the young people, it had all been arranged, and I was able to announce to them the Society would make a distribution of flower seeds for them to grow at their own homes, the results to be exhibited at a public floral exhibit during the summer. The largest room in the school was crowded to hear my address to them, and amongst the audience were several prominent people of the village. If I might be allowed to judge from the earnest and interested look on the faces, and the close attention the young people paid me, and the hearty cheers they gave as well as singing very heartily the national anthem before breaking up, I think we may expect to hear from

the officers of the Cardinal Society a good report of the young people in their flower growing competition during the summer.

The meeting in the town hall in the evening was very well attended, when it is taken into consideration that the population of the village is only about 1,000. The hall was nicely decorated with pot-plants. My lecture proper was chiefly on the "Care and Culture of Window Plants", which seemed to interest all present, for at the close, although past ten o'clock, I was handed quite a number of questions, the tenor of which showed most clearly that the audience were anxious to obtain all the information possible on all branches of horticulture. One fact I am pleased to mention is that the ministers of all religious denominations represented in the village were at the meeting, and were unanimous in their opinion regarding helping to interest more especially the young people in the love of plants and flowers.

I left Cardinal by the midnight train, a local clergyman kindly accompanying me to the station. I felt pleased with my visit to this pretty little eastern village, with the waters of the mighty St. Lawrence rolling ceaselessly and noiselessly past it, and certainly joined with many of those I had seen there in the hope that I might be able at some time to see their village in all its summer beauty, and enjoy the magnificent view across the broad St. Lawrence much better than I could when its shores were bound in winter's icy grasp.

I reached Picton, Prince Edward County, at noon on St. Patrick's day, where Mr. Ross, the genial secretary of the Society there, introduced me to several of the members before escorting me to the High School where I had the pleasure of a thirty-minute talk to the young people, about eight or ten of the teachers also being present. This school is situated in quite extensive grounds of about two or three acres in extent. Already steps are being taken to improve the landscape features of the grounds, and I was pleased to be able to compliment some of the trustees who were present on their foresight in securing such extensive grounds, a point that is sometimes lost sight of, when school sites and grounds are first obtained. The officers of the Society here promised to use their best endeavor to make an effort to do something practical for the young people in the near future to encourage the interest they evidently have in floriculture. For the present season, however, it may not be practicable as they had already made plans for their distribution to members.

The evening meeting was only fairly well attended, but all seemed very much interested, and at the close of my lecture handed me quite a number of questions on almost every feature of fruit and floriculture, many of the questions requiring answers that amounted almost to the magnitude of an address. That gave me pleasure, because I knew that practical information was really desired by the questioners.

In spite of my efforts to reach Stirling in time to address the scholars at the public schools there, I was disappointed, as I could not owing to my inability to catch the early train at Belleville for Stirling, reach there before nearly seven p.m. Here I was met at the station by Mr. Thrasher, President of the Society, who informed me that I could have taken the Central Ontario Railway to Anson, and could have driven over to Stirling and reached there by three p.m. I mention this for the benefit of any lecturer who may have this trip another year.

The Stirling people turned out in good numbers, the town hall being fairly well filled. Here also I found many enthusiastic horticulturists,

as was evidenced by the nice display of pot-plants arranged around and about the platform. My address here was mainly on out door decorative plants, although I gave a brief talk on "House and Window Plants". "Plants for the Perennial Border" was a subject that seemed to interest many in the audience, so I devoted quite a large share of my two hours' talk to that feature of floriculture. Quite a number of verbal and written questions were asked of a widely varied nature, a fact that gave evidence of the interest taken in all branches of horticulture. On learning that the young people of Stirling were very disappointed at my not being able to address them, I offered to stay over the Saturday and address them, but as many of them lived quite a distance in the country it was thought better not to make the attempt. I find that all lecturers previous to my visit have been unable to reach the young people, I trust that next year it may be possible to do so by taking the route I have mentioned.

As my next point to visit was Millbrook, Durham County, where I was due on Monday the 21st, I stayed over in Peterboro', and took the opportunity of looking up the secretary of the Society there, as well as taking a look at the parks, or rather that part of them visible above two or three feet of snow that had commenced to thaw rapidly, making walking very unpleasant. I found the parks at Peterboro very much over planted, the shade and ornamental trees in both Central and Victoria parks (I think those were the names) very much crowded, but was told by the secretary of the Society, that a number of the trees had already been thinned out and that more were to be taken out this season. I mention this matter to call the attention of our readers generally, many of whom are more or less interested probably in the laying out of parks and public grounds in their neighborhood, because one of the most common errors that amateur landscape gardeners make is that of over-crowding or over-planting.

On reaching Millbrook, I was met by Mr. Armstrong and Mr. Govens, the President and Secretary of the Millbrook Society. The former gentleman accompanying me to the public school, where I found about 200 of the more advanced scholars assembled to meet me, who listened very intently to my remarks, being evidently much interested in the student work in practical floriculture as carried out at the O. A. C. A picture of a banana, with a large bunch of fruit showing, as seen growing in a greenhouse here was a source of great interest to the young people, as well as a picture of the student's laboratory or greenhouse at the College that I had with me. The young people gave Mr. Armstrong and myself some hearty cheers when I informed them that it was just about settled that the Society would make a distribution of flower seeds to them, the same as was being done in other places I had visited. At a meeting of the Executive of the Society held after, to which I was invited, I had an opportunity of speaking on the above subject, when it was unanimously resolved to give each of the young people a packet of aster seeds for growing at home. The school grounds here are about two acres in extent, situated on a hill overlooking the village, and already have a row of maples surrounding them looking thrifty and well. I was also given the opportunity of making a few suggestions regarding the planting of shrubs and perennial border plants, which it is the intention of the school executive to plant on the grounds. The meeting in the evening was well attended, considering the attendance was limited to the residents of the village, the county roads being in bad shape. I spoke, by request, on several different features of floriculture, chiefly referring to planting and decorating the home grounds, as well as

a talk on annuals and perrennials, etc. Here, as at other places, a number of verbal and written questions were asked, all of them requiring direct and practical information.

At Lindsay, I had the pleasure, through the kindness of Mr. Robson, President of the Society, of an interview with Mr. Beall, the veteran organizer of Horticultural Societies, and had the pleasure of a chat with him amongst the natural beauties of the grounds surrounding his thoroughly home-like residence. I addressed about 150 of the scholars of one of the largest schools in Lindsay, and had a good meeting in the Council Chamber at the City Hall in the evening. My talk here was chiefly devoted to the "Culture of Window Plants", although several other matters were touched on, more particularly in answer to the numerous questions asked after the meeting.

My next visit was to Midland, where I had a very enjoyable and busy experience. I reached there early in the afternoon, and was met at the station by the President, Mr. F. Cook, and by Mr. Piggot, an enthusiastic flower grower. These gentlemen accompanied me to both the east and west ward schools, where by arrangement previously made, I met not only about 400 of the older scholars, but also a good number of interested townspeople. The young people were delighted apparently, and gave all present three hearty cheers after singing the National Anthem, as well as carrying some of their enthusiasm with them down through the town, which fact probably accounts for the large attendance at the meeting in the parlors of the Y. M. C. A. building in the evening, the room being crowded. A very nice feature of this meeting was the piano selections artistically played by Miss Potvin, the selections making quite a pleasing variation to the lecture, as well as helping out the thorough heartiness shown in singing "God Save the King" at the close. At this meeting many of the questions asked were on matters pertaining to civic improvement, a subject that from the interest shown means that this progressive town away on the shores of the Georgian Bay intends to be in line with the rapid advances that all of our Canadian towns are showing in this respect. I was glad that, from experience gained in Hamilton especially, I was able to be of some assistance among lines that are oftimes somewhat outside the sphere of practical floriculture. Since reaching home I have had a communication from the secretary there asking me for some notes on the culture of asters, as they were distributing 400 packages of aster seeds to the scholars there. I complied with the request with pleasure, also sending them a copy of Rules and Regulations for the aster competition as well as a schedule of premiums as rewards of merit for the best results shown from the culture of the seeds.

From Midland I journeyed by rail to Thornbury, as the cross country roads were simply impassible, no stages or conveyances of any kind being able to make the trip. At and near Thornbury, the Indian and Beaver rivers were decidedly on the rampage, and it was a question whether we could get through at one point near Thornbury. On arriving there I found both the residents of Thornbury and Clarksburg in a rather excited condition, as one or two of the mill dams of the Beaver River had been swept by the floods into the Georgian Bay, a fishing boat as well being sunk. It was impossible to think of speaking to the scholars, as most of them were out watching the floods. However, the meeting in Thornbury Town Hall in the evening was very well attended considering, and although the outside roads were next to impassable, a few from the country around were at the meeting. I found the audience here very much interested in fruit culture, many of the questions asked being along those lines. I found that

great damage had been done to fruit trees from girdling by mice, from want of proper precautions having been taken to protect the trees.

Owen Sound was my last place to visit, and from the fact that the twenty-one days' seige of ice and snow had only been raised a few days when I visited them, I was prepared for a possible uninteresting visit. In this, however, I was very agreeably disappointed, for shortly after arriving there, I was taken in hand by Dr. Cameron, the President of the Society, who first of all drove me around to see some of the interested members of the Society, as well as the many points of interest of this Liverpool of the north, after which I had the pleasure of meeting one of the largest assemblies I had met of young people, not only of the institute pupils and the large staff of teachers there, but also all the entrance scholars of the public schools, together with members of the School Board and citizens, the large assembly room being well filled. The young people here were deeply interested in my remarks, giving close attention to my thirty minute talk, and even then I had to continue for another fifteen mintutes after four o'clock before there was any desire whatever for me to stop, my reference to the introduction to Nature Study in the schools, as well as the practical work, and the illustrations of work by the students at the College, evidently interesting very much not only the young people, but also the teachers and visitors present. The Society here will in all probability do something for the young people in the matter of distributing flower seeds, for, as one of the members of the school board remarked after, it was thought from the interest shown and the greeting the speaker received that it would hardly be possible to live in Owen Sound unless something was done either by the Society or the school board for the young people along the line of floriculture.

I left Owen Sound well pleased with my visit, and fully satisfied that it had been the means of helping the idea and the efforts of many of the citizens to secure a pretty and bright town, one that is already naturally one of the prettiest towns of the many picturesque places to be found on the shores of our northern lakes.

In concluding this report, that I am afraid will be considered a far too lengthy account of my lecture trip, I may say that one of the most pleasing features was that of meeting so many young people who will soon have their share of the destinies of our fair country in their hands, and I always feel that when addressing them that we scarcely realize perhaps the responsibility that rests with us older people in this respect. Mould the character and principles of the young people along lines that will influence and elevate their ideas. This can often be done by indirect means, other than by strictly moral and direct moral teachings; or, at least, indirect methods are of great service as accessories to strictly moral teachings.

During my trip I addressed fifteen meetings with an aggregate attendance of about 2,000 persons in all.

PRESIDENT'S ADDRESS.

W. H. Bunting, St. Catharines, Ont.

I am glad to welcome so many of the representative men engaged in fruit growing to this joint meeting and exhibition. I appreciate the fact that, owing to the many attractions of the City of Toronto, there may be some difficulty in getting our people together. This is a difficulty that was anticipated by us. While we have not present this morning as large a

gathering as we have usually had in the past, I believe that those who are here are thoroughly in touch with the fruit growing interest of the Province.

During the past year we have perhaps passed through one of the most trying climatic conditions with which the fruit industry of this Province has ever had to contend. The severity of last winter resulted in the destruction in some sections of the Province of a large number of fruit trees. In addition to that, during the present season, in some localities, we have been visited by a serious scourge in our vineyards. The San José Scale infestation, which came upon us some years ago, has also been increasing in some districts. In sections, however, where attention has been given to the best methods of treatment, the infestation is not causing the same amount of dread that it did a few years ago. We are beginning to realize that it is possible to control it, and we have now strong hopes that this pest, which at one time was feared would almost annihilate the fruit industry of this Province, will be controlled, and will, to a certain extent, be a blessing in disguise, from the fact that it will lead to better methods, and in the end result in a better class of fruit being produced.

Our friends in the western part of the Province have our sympathy at the present time. In the winter of 1898-99, they met with a calamity that was an almost staggering blow. With a good deal of energy and hope for the future, they went on again and replanted the orchards that had been destroyed. Last year when this Association met at Leamington, a number of us had an opportunity of inspecting their orchards, and it was a revelation to many of us as to what our friends in the west were doing. They were looking forward to being able to produce large quantities of peaches in the immediate future from their excellently cared for orchards. They have, I fear, suffered more seriously from the severity of last winter than the majority of us, and our sympathies go out to them in their calamity. I am glad to know that these difficulties are not discouraging them, but that they are seeking remedies for these adverse climatic conditions to which they are sometimes liable. They are branching out into other lines with good promise of success, and I have no doubt that their energy and indomitable perseverance will in the end be rewarded with unbounded success.

Notwithstanding the adverse circumstances I have mentioned, I believe there never was a time in this Province when the outlook for those engaged in the business of producing fruit—those who are prepared to adopt the best methods of cultivation and treatment, and the best means of preparing and marketing their products, who are seeking for information from every available source, and who are prepared to sacrifice themselves if necessary in the effort to accomplish their ideals—I say that I do not think there ever was a time when the prospects of the industry were better or brighter than now. The opening up of our northwest country, and the exploitation of foreign markets, are becoming very great factors in this connection. While we have had temporary gluts in the market in the past, I believe the time will come very soon when, by proper co-operation and distribution, we shall be able to place our fruit in the hands of the consumer in such a way that it will not only give satisfaction in every respect, but will also bring a satisfactory return to the producer.

All classes of our people are prospering at the present time, and I can see no reason why the fruit growers should not share in that prosperity. The business of fruit growing requires more technical knowledge, more experience and more application than most other callings, and there is no

reason why you should not share with the best of our manufacturers, the best of our merchants, and other classes of our people in the prosperity which this country is enjoying.

There have been very many important developments in connection with the work of the Association during the past year. This Association was one of the first to take action in connection with the appointment of a Railway Commission for this country, recognizing the necessity for some tribunal for the amicable adjustment of the grievances under which the fruit industry, in common with other industries, was laboring. When the bill passed the Dominion House, a certain amount of anxiety was felt as to the personnel of the Commission. I think I am free to say, without disparagement to any member of the Commission, that when the name of our honored friend, Dr. James Mills, was mentioned as member, no name could have been mentioned that would have been better received by members of this Association, and by agriculturists and horticulturists generally. Owing to the consequent retirement of Dr. Mills from the Presidency of the Ontario Agricultural College, several other changes resulted. Our Secretary, Mr. G. C. Creelman, was appointed to the vacant position, and was in consequence obliged to resign his immediate official connection with our Association. We are able, however, to put in his place a gentleman who had been connected with our work for sometime, and in that way our arrangements were not upset as completely as might otherwise have been the case. Mr. Hodgetts, who was appointed to the secretaryship at that time, has been able to fill this office to the satisfaction of the executive and the board of directors.

The appointment of the Railway Commission has resulted favorably to the fruit interests, but I will not, at this time, go into the particulars of the results of our appeal before the commission.

At our last meeting we endeavored to arrange for the organization throughout the Province of co-operative societies for the better handling of our fruit. This work has been prosecuted, and during our meetings we shall receive some reports upon it. During the past year, a very extended series of orchard meetings have been held, and they have been attended with pronounced success.

Your executive, and the committee appointed to work with it, were able to induce the Canadian National Exhibition Association to revise its fruit prize list, to considerably extend the same, and to place it on a basis that will I think commend itself to all practical fruit growers.

The magazine of the Association, *The Canadian Horticulturist.*—a magazine of which we have all been proud, and which has stood in a class by itself—has not in the past, owing to circumstances over which we perhaps had no control, been on a financially paying basis. An effort has been made by the Executive during the past year to place that magazine, so far as its finances are concerned, in a more satisfactory position. With that end in view, we secured a business manager, whose duties were to co-operate with the editor, and especially to look after the financial end of the publication. I am happy to report to you that very great success has attended our efforts, and that this publication will in the near future be on a paying basis, and not only so, but that it will be possible to very much increase its size and usefulness by adding new departments and placing it on a still higher plane.

I regret to announce to you that, owing to his many duties in connection with the publication of the Fruits of Ontario, and his work in connection with Fruit Experiment Stations under the direction of the Board

of Control, Mr. Linus Woolverton, of Grimsby, who has so ably conducted the editorial management of *The Horticulturist* for the past sixteen or seventeen years, has found it necessary to resign his position as editor. While we regret this, we are glad to know that we have a gentleman who has been acting in the capacity of business manager and associate editor during the past year, who is well qualified to take up the work where Mr. Woolverton lays it down, and to prosecute it with energy and, we believe, with success.

The occasion that brings us together—this union exhibition of the Ontario Fruit Growers' Association, the Ontario Bee-keepers' Association, the Toronto Horticultural Society, the Toronto Gardeners' and Florists' Association, and the Toronto Electoral Society, and the meetings held in connection therewith—will, I believe, mark an era in the history of the Association. This arrangement was somewhat of an experiment and has been a source of considerable concern to the executive and directors of your Association, but I am glad to be able to say to-day, and I am sure that those of you who have inspected the exhibition will bear me out, that the enterprise gives every promise of unbounded success. I trust that, as the years go by, this Association will be able to impress itself more forcibly and more fully than ever before, not only on the public of our own Province, but upon our sister Provinces of this great Dominion.

COMMITTEES.

Nominating Committee: J. S. Scarff, Woodstock; C. L. Stevens, Orillia; J. L. Hilborn, Leamington; Elmer Lick, Oshawa; M. Pettit, Grimsby.

It was moved by Mr. Lick, seconded by Mr. Beall, and carried unanimously, "That rule 23 of the constitution be suspended, and that the Nominating Committee be requested to report as early as possible this afternoon instead of to-morrow morning, as stated on the programme."

The report of the nominating committee was adopted, with slight amendments. (See page 4.)

Committee on Fruit Exhibits: Harold Powell, Washington, D.C.; J. C. Chapais, Quebec; Wm. Armstrong, Queenston; W. W. Hilborn, Leamington; L. Woolverton, Grimsby.

Committee on Revision of Constitution: M. Pettit, Grimsby; Harold Jones, Maitland; A. E. Sherrington, Walkerton; Elmer Lick, Oshawa; W. H. Bunting, St. Catharines.

Committee on Resolutions: Alex. McNeill, Ottawa; G. C. Caston, Craighurst; Joseph Tweedle, Fruitland.

READING OF CORRESPONDENCE.

The Secretary read a communication introducing Mr. J. C. Chapais, delegate from the Pomological and Fruit Growing Society of the Province of Quebec.

REPORT OF TRANSPORTATION COMMITTEE.

The report of the Transportation Committee was presented by Mr. W. H. Bunting, Chairman of the Committee, Mr. M. Pettit taking the chair.

Your Committee beg leave to report, that, immediately after our annual meeting held at Leamington, the members of the Committee as per arrangement, set about securing all possible data with regard to the situation over the entire Province of Ontario as far as the transportation of fruit was concerned. They found that the difficulties and grievances of fruit shippers were many and severe and were of such a nature, the committee felt that if properly put before the Railway Commission, would meet with careful consideration, and would no doubt be remedied as far as practicable.

With this object in view, after several meetings and consultations with the committees of sister societies, an interview was arranged for with the Railway Commission early in June in the City of Toronto. At the time appointed your Committee appeared before the Commission and presented its case in the best manner possible, with the assistance of Mr. Gregory, of this city, who was retained as solicitor for the various societies interested.

The addresses of the members of the committee were listened to with the greatest attention by the Commission. The difficulties encountered through unsuitable and inadequate car service, and the delay in transporting perishable fruits were clearly shown, and frankly admitted by the railway representatives. It was also claimed, and considerable data was made use of to prove the claim, that the rates for the carriage of all kinds of fruit were excessive, and more than the traffic could bear. After some little delay during which your committee was not idle, the Canadian roads interested in the fruit trade practically granted all that was asked for by the committee, with the exception of the rate of the carriage of apples in barrels. This charge your committee still think is excessive and out of proportion to the value of the product carried and the service rendered. It is hoped that the gentlemen composing the Transportation Committee for 1904-5 will take up this question vigorously and bring it to a satisfactory issue.

This concludes the Committee's report. As to the concession secured from the railways, there are a few points to which I should like to call the attention of the meeting.

Pears have now been placed in the same catagory with apples in boxes and barrels. Apples and pears, which formerly, when shipped in boxes, were charged for at a higher rate than in barrels, are now carried at the same rate as in barrels.

Our roads had adopted the principle of charging a flat rate for the icing of refrigerator cars without reference to the cost of same. We succeeded in having that grievance completely removed. We asked that only the actual cost of the service rendered should be assessed against us, and this has been acceded to by the railways, and I am sure will be quite satisfactory to every shipper.

While the railways had voluntarily conceded (and the Commission had approved the concession) pretty much all the Association had asked for in regard to the shipment of tender fruits, no concession had been made in regard to the rate on apples. What has been obtained is of material benefit to one section of our fruit-growers, but this is a comparatively small section, the growing of tender fruits for commercial purposes being limited to one or two small areas. A concession on the rates on apples would be of benefit to the whole Province. To the country at large no concessions have been made as yet except as regards the rate on boxes. It is felt that

the rate on apples is altogether out of proportion to what the traffic will bear, and at a meeting of the Committee last Monday night, the following resolution was unanimously adopted:

"That this Committee, while realizing the advantages to the fruit trade that will be the result of the concessions granted by the railway companies of this country in the matter of rates, as well as in the promise of increased equipment of a suitable nature for the transportation of fruit and other perishable products, together with better despatch in forwarding, your Committee is still very strongly of the opinion that the request for a material reduction of the rate of carriage for apples in boxes and barrels is a reasonable one and should be granted, and they would urge upon the Association to take such further action in the premises as may be necessary to secure, if possible, this most important change."

I may say that the Commission is taking active steps to acquire all the information possible as to the best cars for the transportation of perishable products. When this information has been secured, a recommendation will be made to the railways of this country. I had the pleasure of visiting New York in company with the chief traffic officer of the Railway Commission, and a representative of the G.T.R. and C.P.R., where we spent several days in securing information on this question, which I have no doubt will be very valuable to the Commission. I have every hope that within the next twelve months, the equipment of our railways for carrying fruit will be very much improved.

Not the least of the good results that will accrue to the fruit interests of this country as a result of our appeal to the Commission, and the placing of our case before the railways through the Commission, is the fact that from this out there will be a better understanding between fruit shippers and carrying companies. The magnitude and importance of the business is better realized to-day than ever before. Now that we have been able to lucidly state our grievances, and put the facts before the railways in a reasonable manner, I believe they are impressed with the necessity of paying special attention to this traffic and will join with us in every reasonable effort to place our products before the consuming public in the best possible way, so that we may be able to give satisfaction to our customers and receive a fair return for our efforts.

Mr. Caston: Is it a fact that they have given reduced rates on apples in certain portions of the country and not in others?

Mr. Bunting: The first proposition of the railways was to make a reduction on rates only from the large shipping sections to the large receiving sections, and all other places were to be left out of consideration. We pointed out that this would be unsatisfactory and unfair, and as a result of our pressure in that respect we have the privilege of shipping a car load of fruit from any point in Ontario and Quebec to any other point in Ontario and Quebec at reduced rates. We also have similar privileges for a half car of 10,000 pounds or over. When it comes to shipping to the North-west, the privilege does not apply to every part of that territory. It applies only to three cities, Winnipeg, Brandon and Portage la Prairie. It also applies to any point in the Maritime Provinces. In the future I judge it will not be difficult to make the concession applicable to other important places in the North-west. You will bear in mind, however, that there is no reduction to the North-west on half car lots. The railways consider this a very long haul, and object to carrying a car from Ontario to the North-west unless it is full, and I think that is a reasonable condition.

Mr. Caston: I think it should be made to apply to any point in the North-west, because apples are shipped right to the Rocky Mountains.

Mr. Bunting: You will understand there is no reduction on apples at present.

Mr. Caston: We need such a reduction.

Mr. Bunting: There is no doubt about that.

Mr. Pettit: I think it is a matter for congratulation that this Association had a President who could so ably present its views to the Railway Commission. The chairman of the Commission congratulated him on the able manner in which he presented the case. I think we should move a resolution of thanks to this committee for the work they have done.

It was moved by Mr. G. C. Caston, seconded by Mr. Thos. Beall, that the report of the Transportation Committee be adopted. Carried unanimously.

W. L. Smith, *The Weekly Sun*, Toronto: What the President has said as to the present attitude of the railways is very gratifying, and I think that this Association is more indebted to Mr. Bunting for the fact that they have assumed this changed attitude than to any other man in the country. I think that the least the Association can do is to recognize the services rendered, and to present him with a resolution, properly engrossed and framed, so that it may be preserved, as a slight recognition for his services. I beg to move a resolution to that effect.

Prof. Hutt seconded the resolution, which was unanimously carried.

Mr. Bunting: I thank you very much for your kind appreciation of what I have been able to do, assisted by the Committee. It has not been altogether disinterested because, as a shipper myself, I have felt for many years the difficulties under which the industry was laboring. It has been a source of gratification to me to spend some little time in investigating this matter, and presenting our grievances in the best possible way to the tribunal appointed to deal with them.

THE CONCESSIONS MADE BY THE RAILWAY COMPANIES.

As a result of the evidence given last summer by representatives of the fruit growers before the Railway Commission, when it met in Toronto, the following concessions to shippers have already been approved by the commissioners. These concessions have been voluntarily proposed by the railway companies. It is expected further concessions will be made later.

The changes are:

(a) That under the heading of "Fruits," the Canadian freight classification be amended by reducing pears (green), in boxes, or barrels, from first-class to third-class in less than carloads, and from third to fifth class in carloads; also that apples (green), in boxes, which are at present second-class in less than carloads and fifth-class in carloads, be made third-class in less than carloads and fifth-class in carloads, thus making the classification of apples and pears in boxes or barrels uniform.

(b) That fruit described in the current Canadian freight classification as "fruit, fresh," be carried in baskets, boxes or crates, viz.: Between all stations in Ontario, east of Sault Ste. Marie and Fort William, and between all stations in Quebec, and interprovincially between Ontario and Quebec, also from stations in Ontario and Quebec to stations in New Brunswick and Nova Scotia, at fourth-class rates in carloads of not less than 20,000 pounds.

instead of third-class, as at present, and at second-class rates in less than carloads of 10,000 pounds or over instead of first-class, as at present. Also from stations in Ontario and Quebec to Winnipeg, Portage la Prairie and Brandon, at fourth-class rates, in carloads of not less than 20,000 pounds, instead of at third-class, as at present.

It is understood in all cases that the total charges on a smaller lot shall not be greater than the total charges on a larger lot at the next lower rate, as indicated above.

(c) With respect to the charge made by the railways for refrigerating shipments in transit, it is ordered that the average actual cost of the ice and the placing thereof in the cars shall not be exceeded, and that, pending a decision by the board as to a reasonable charge for such service, the charge for refrigeration shall not be more than $2.50 per ton of 2,000 pounds on the actual weight of the ice supplied.

REPORT ON THE CANADIAN HORTICULTURIST.

H. B. Cowan: For a number of years *The Horticulturist* has been financed by the Ontario Fruit Growers' Association, its annual deficits being paid out of the Association's annual Government grant. This has been a drain on the funds of the Societies, and repeated demands have been made to have the magazine placed on a paying basis. These attempts have failed largely because of the system of management. None of the directors of the Fruit Growers' Association are directly interested in the financial success of the magazine, and it is impossible for them to get together and properly supervise it. Then the editing for some time was done in one place and the business arrangements in another. Last March I was placed in charge to see what I could do to place *The Horticulturist* on a paying basis. I have worked at it, and we have secured a considerable increase in the revenue from advertising. But, my experience has clearly demonstrated to me that it will be impossible to successfully conduct the magazine without better business management. The work is now being done in the Department. If the magazine is to be made a success, it must have an advertising manager; subscripton clerks are necessary, and new departments will have to be added. This will make it too big a proposition for any officer to handle through the Department. If things remain as they are, the magazine must run along as at present, instead of becoming such a journal as you feel you require in the interests of fruit growing and floriculture. After thinking the matter over for some time, I concluded the best thing to do would be to form a joint stock company of fruit growers and floriculturists to take over this journal. Mr. Bunting and myself discussed the idea and we wrote the directors, and found all were in favor of the proposition. The Minister was finally asked if I might be allowed to see if a joint stock company, composed entirely of fruit growers and florists, could be formed to take over the control of the magazine, and to continue it as the official organ of the Association. On gaining the consent of the Minister, a committee of fruit growers looked into the mater carefully and concluded that, while there were no big profits to be made, the magazine might be made to pay its way. I therefore prepared a prospectus and sent it around among the fruit growers and floriculturists. One publisher, it was intimated, might take all the stock if given an opportunity, but that we decided could not be considered. It is proposed to capitalize the company at $10,000, and to give the Association $1,000 worth of stock for their good will; that they should purchase and

other $1,000 worth, giving them $2,000 of the stock altogether; and that of the $10,000 subscribed, $3,000 shall be paid up. It was felt that the Association should have that amount of stock to assure it a large share in the management. The required amount of stock was promised in less than three weeks. It is for this meeting to decide whether or not this plan shall be carried out.

Q. What is the present circulation ?

Mr. Cowan: Only about 4,300, three-fourths of which is among Horticultural Societies. It is felt that the paper should have a larger circulation among the fruit growers. It is thought that if the price could be reduced to 60 cents a year to subscribers, and 50 cents to the Societies, it would result in a material increase of circulation.

Q. What will you do with the funds of the Association if they are not put into the magazine ?

Mr. Cowan: The directors say there is plenty of work to carry on if they had the necessary funds.

Q. What guarantee has the Association that the paper will be conducted as much in their interest in the future as in the past? It seems to me that recently the magazine has been devoted too largely to floriculture.

Mr. Cowan: When I took hold of the magazine, I found that three-quarters of the subscribers were flower growers, and that the circulation had fallen off about 1,000 because that department was being neglected. We could get little advertising, and the paper was on the rocks. Since then more attention has been given to the floral department. I think the interests of the Association will be safeguarded by its $2,000 worth of stock, and the fact that the fruit growers hold the stock almost entirely amongst themselves. Then a committee is to be appointed by the Association to advise with the business management of the paper, and make such arrangements as they think will safeguard the interests of the Association.

Mr. Bunting: Arrangements satisfactory to the Board must be concluded or the proposition will fall through.

Mr. Elmer Lick moved, seconded by A. E. Sherrington, that the report be adopted. Carried.

REPORT ON NEW AND SEEDLING FRUITS.

By H. L. Hutt, Ontario Agricultural College, Guelph.

The number of seedling fruits sent in this year for examination was much smaller than usual, no doubt owing to the light crop of fruit generally throughout the country. The most important specimens received were as follows:

No. 1. From J. W. Hotson, Innerkip. A large seedling apple very much resembling Northern Spy and no doubt a seedling of that variety. This apple is said to be excellent for cooking and keeps well until May. This is a valuable seedling, but not enough superior to Northern Spy to recommend it for general propagation.

No. 2. A seedling apple from P. L. Baker, Oakville. This is a large showy, red apple, very much resembling Red Astrachan, and of about the same season. Not enough superior to Astrachan to make it worth introducing.

No. 3. A large, showy crab seedling from Thos. W. Knight, Breckinrig, Ont. This is a very large showy crab with a long slender stem, color

fair to good. An excellent crab, and might be worth propagating for northern sections.

No. 4. From Edwin Peart, Nelson, Ont. A medium-sized, roundish oblate apple, highly colored and something like Canada Red. This apple is from an old tree which has been in bearing for forty years, and is said to bear heavily every year. It is valuable because of its good cooking quality and red color of the flesh, which shows well when fruit is cooked. Season about the same as Alexander.

No. 5. A seedling pear from E. C. Beeman, Newcastle, Ont. This seedling was described in my report upon New Fruits three years ago. This year Mr. Beeman sent for examination a basket of the fruit when fully mature. He values this seedling highly because of its hardiness, productiveness, and fair quality. This pear is of peculiar shape, being almost as round as an apple, which should make it desirable for packing for shipment. The flesh is buttery and melting, the quality is fair to good, having more acidity than most pears.

The following new varieties have been tested at the Trenton Fruit Experiment Station for several years past, and are the most promising among two or three hundred new varieties under test:

First, Garden Gem. A medium to small sized apple of light red color, good quality for dessert, in season October and November. This apple is wonderfully productive and is well worthy of propagation as a dessert apple for home use.

Second, Parline's Beauty. A medium sized apple of beautiful dark red color, and excellent quality. The tree is wonderfully productive, and the fruit keeps well till January or February.

Third, Coo's Beauty. A new variety of which scions were received some years ago from California. The fruit is large and regular as a Blenheim Orange, of a beautiful bright red color, somewhat mottled, quality excellent, season October to December. So far this has not been remarkably productive, but it is certainly one of the finest new varieties introduced.

Q. Is the tree quite hardy ?

Mr. Hutt: So far it appears to be. It was tested at the Trenton Station. We intend to distribute this variety to all the stations next year.

Mr. Stevens: We very much need in the Orillia section, an apple of the Spy quality, that is hardy.

Mr. Sherrington: Is it better than the Spy ?

Mr. Hutt: I cannot say that it is.

Mr. Hutt: Two or three years ago I received 40 or 50 seedling peaches growing in Guelph. We planted them at the College, but last year we lost all except a dozen or so that were small enough to be below the snow line.

Mr. Macoun: We tried to grow some in Ottawa. I tried seed from a plum tree grafted on a peach stock. The plum died and the peach grew up and was loaded with fruit, and is very hardy. I saved a number of these stones, and have planted them, and it is possible we may get a hardy variety.

Mr. Stevens, Orillia: We had a hardy seedling peach up to two years ago which produced a very large crop. I sent some scions to Mr. Macoun, but the tree had overborne itself, and they were weak and did not succeed. Last winter I thought it was killed, but I find that suckers are growing up from the root, andI shall be glad to send Mr. Macoun scions from these.

Mr. Macoun: We have had fruiting at Ottawa for two years, a grape which we obtained from Mr. Reed, of Port Dalhousie. It is proving to be

one of the most promising we have. It is a hybrid between the Concord and the Black Hamburg. It is a tremendous bearer, and almost as early as Moore's Early with us. I believe it is called the Lincoln.

W. H. Bunting, St. Catharines: I saw this grape in a vineyard with other varieties, and the other varieties were without exception ruined with black rot while this one was quite free from infestation. I can corroborate what Mr. Macoun has said as to its bearing qualities, etc.

A Member: I should like to ask Mr. Macoun as to tenderness of bloom in Japanese and European varieties of plum, and whether he has ever sprayed with sulphur and lime as a remedy?

Mr. Macoun: We tried spraying with whitewash for retarding the buds. It retarded the buds, but did not save the blossom, and we used a very heavy application. The trouble with us is that the buds dry out. It is the dry, cold wind in winter that kills them.

Q. What experience have you had with Russian pears; are they worth growing?

Mr. Macoun: I would rather send to the Niagara District and buy pears than attempt to grow Russian varieties; they are rotten before they are ripe.

REPORT ON FRUITS FOR THE ONTARIO FRUIT GROWERS' ASSOCIATION, 1904.

By W. T. Macoun, Horticulturist, C. E. A., Ottawa.

There were not so many new fruits sent in for examination this year as last year, and those that were received were confined to apples and plums. A few of the most promising are noticed:

Apples.

Edwin Rakestrow, Township of Ryde, Muskoka District, Seedling Apple. Fruit: Size, above medium; form, oblate roundish; cavity deep, medium width, russeted; stem short, moderately stout; basin open, deep; calyx open; colour yellow, well washed with bright red; dots few, indistinct; skin thick, moderately tough; flesh yellowish, tender, juicy; core medium; flavour subacid, sprightly, pleasant; quality good, season evidently October; tree, quite hardy. Seed sown by daughter of Mr. Rakestrow eight years ago. Had one apple in 1903 and fifty this year. Fourteen miles from Gravenhurst. A promising seedling. Not as high flavoured as Wealthy, but a good apple. Promising specimens received from J. P. Cockburn, Gravenhurst, Ont.

J. Gossley, Richmond Hill, Ont. Apple. Fruit: size, medium; form, roundish, slightly angular; cavity deep, open; basin medium depth and width, smooth; calyx open; colour yellow, well splashed and washed with bright red; dots few, small, yellow, indistinct; skin moderately thick, tough; flesh yellow, crisp, tender, juicy; core medium; flavour subacid, pleasant; quality good to very good; season mid to late winter, evidently. Tree said to be a cross between Canada Red, Baldwin and Spy. Much like Spy in appearance and flavour, but is not as good flavour as Spy.

S. Greenfield, Ottawa East, Ont. Apple. Fruit: Size, above medium; form, roundish conical, angular; cavity, medium depth and width; stem short, slender; basin medium depth and width, wrinkled; calyx closed;

colour yellow, almost entirely covered with deep crimson; dots moderately numerous, yellow, distinct; skin thick, tough; flesh yellow, moderately juicy, rather coarse; core medium; flavour subacid, pleasant, quality good; season evidently October and perhaps later. Seedling of Mr. Greenfield's. If this apple has better points than Wealthy it may be useful, but it is not as juicy nor as tender in the flesh as Wealthy, though perhaps a little higher flavoured.

Miss P. L. Baker, Oakville, Ont. Apple, seedling. Fruit: Size, large; form roundish; cavity narrow, medium depth, lipped; stem short, slender; basin narrow, medium depth, almost smooth; calyx open; colour pale yellow almost covered with crimson; dots obscure; skin thin, tender; flesh white; core, medium; flavour subacid; slightly astringent; quality good; season evidently late August to early September. Tree a seedling about ten years old. Blossomed for first time this year. Blossoms very large. A handsome apple resembling Red Astrachan very much in outward appearance and probably a seedling of it. Resembles Langford Beauty and Russell in character of flesh and flavour.

In addition to these apples which are brought before the Association for the first time, there are a few other varieties which may be classed as new and which were brought specially under our notice this year. Among these may be mentioned the Walter apple which came through the last severe winter in good condition and bore well this year. This apple is a cross originated by the late P. C. Dempsey, Trenton, Ont., the female parent being Northern Spy, and the male Golden Russet. The original tree is still in the orchard of Mr. W. H. Dempsey, Trenton, Ont. The apple is very large, handsome, yellow, well splashed and streaked with red; quality good; season October and November at Ottawa. It will probably be a useful apple in the colder parts of the country if it is found to be as hardy as Wealthy. Of hardy winter apples the Milwaukee and North Western Greening appear to be two of the most promising of the newer sorts. The Windsor Chief, which up to this year was thought to be one of most promising of the more recent introductions, was winter-killed in Eastern Ontario and the Province of Quebec last winter.

Forty-seven new seedlings of Russian apples fruited at the Central Experimental Farm this year. None of these are promising enough to be reported on here, but several are as good as most of the named Russian apples and will be tested in Manitoba and the North-west Territories.

A large number of seedlings of McIntosh Red, Fameuse, Northern Spy, Pewaukee, Lawver, Salome, Wealthy, and others are planted at the Central Experimental Farm, which should give some valuable new varieties. They are now beginning to fruit. Seventeen crosses between McMahon White and Scott's Winter fruited this year. Some of these give promise of being superior to Scott's Winter.

Plums.

The Americana plums have been receiving a good deal of attention of late years, and the following varieties, which fruited at the Central Experimental Farm for the first time this year, are among the best which have been tested, and are well worthy of being grown where the European varieties will not succeed:

Admiral Schley—Fruit received from Central Experimental Farm. Form roundish; size, very large; cavity, narrow, shallow; suture a dis-

tinct line; apex rounded; colour yellow, well washed with deep bronzy red; dots numerous, small, yellow, distinct; bloom thin, bluish; skin moderately thick, tough; flesh deep yellow, juicy; stone large, oval, flat, cling; flavour sweet, rich, good; quality very good. One of the best Americana plums yet tested. Apparently an improvement over Hawkeye, Americana group.

Bomberger—Fruit received from Central Experimental Farm. Form roundish to broad oval; size very large; cavity shallow, narrow; suture a distinct line; apex rounded; colour yellow, more or less covered with deep lively red; dots few, small, yellow, distinct; bloom medium; skin thick, tough; flesh deep yellow, juicy; stone medium size, oval, flat; flavour sweet, rich; quality very good. A very handsome plum. More attractive than Hawkeye. Promising. Americana group.

Smith—Fruit received from Central Experimental Farm. Form roundish to broad oval; size large; cavity narrow, shallow; suture a distinct line; apex rounded; colour yellow, mottled and washed with red; dots obscure; bloom light; skin thick, moderately tough; flesh yellow, juicy; stone rather large, oval, nearly free; flavour sweet, good; quality good to very good. A good plum. Promising. Americana group.

None of the Japanese plums have proved sufficiently hardy in the flower bud at Ottawa to be satisfactory. The Red June, however, has produced a few plums from time to time, and from these have been grown some seedlings. Two of these appear to be much hardier in the flower bud than the named varieties on the market, and fruited this year when there was not a European plum in the orchard. The best one has been named Togo, a description of which is given herewith.

Togo (seedling of the Red June.) Fruit received from Central Experimental Farm. Form roundish, somewhat heart shaped; size above medium; cavity narrow, medium depth, abrupt; suture an indistinct, sometimes distinct, line, no depression; apex slightly flattened; colour deep red; dots numerous, small; bloom moderate, bluish; skin yellow, moderately thick, tough; flesh yellow, firm, juicy; stone medium size, oval, slightly flattened, cling; flavour sweet, good, acid next skin; quality good. A promising plum. Larger than Red June, and better in quality. Handsome. Named Togo, Aug. 13th, 1904, in honor of Admiral Togo. Triflora group.

One seedling European plum was received which resembled Lombard very much; following is a description of it:

Thos. C. Paddon, 62 Bolton Ave., Toronto. Plum seedling. Form broad, oval; size above medium; cavity deep, narrow, abrupt; suture a distinct line, not depressed; apex rounded; colour dark purplish red; dots numerous, small, yellow, distinct; bloom appears light; skin moderately thick, tough; flesh deep greenish yellow, juicy, firm; stone medium size practically free; flavour moderately sweet; quality medium to above. Tree said to be a seedling. Tree is an upright grower, stands about twenty-five feet high and is a good heavy cropper. It resembles Lombard very much. Should be a good shipper. Domestica group.

The difficulty with winter apples in our section is that the wood does not ripen and the winter wind kills them out. The Milwaukee apple is peculiar, and I think has some points that make it stand our winter better than others. Shortly after the apple is picked from the tree, the skin turns yellow, making it look as if it were mellow and ready for use. It can be used then, but it will keep all winter without any trouble; but the fact that it turns yellow indicates to my mind that the wood of the tree has

been thoroughly ripened, and that is the kind of tree we want—a tree combining early ripening of the wood, and an apple that will keep all winter. It is a seedling of the Duchess and just like it in quality, acid and juicy and a capital keeper.

E. Morris, Fonthill: There is no field of operations in which the fruit men can do more than in the hybridization of apples. In this work as much attention should be paid to the hardiness of the tree as to the quality of the apple. I should be afraid of the cross Mr. Macoun mentioned, as it is a short-lived tree, and McIntosh Red is a weak grower.

HANDLING THE FRUIT CROP FOR COLD STORAGE.

By G. Harold Powell, Pomologist in Charge of Fruit Storage Investigations, U. S. Department of Agriculture, Washington, D. C.

I desire to express the gratification of the Secretary of Agriculture of the United States that this Department has been invited to take part in the discussions of your Association, and I wish also to extend the greetings of the Honorable Secretary to the fruit growers of Ontario. It gives me personal pleasure to meet with you and to learn something of the conditions of your fruit growing industry.

I have been asked by the Secretary of your Society to discuss the "Cold Storage of Fruit". The Department of Agriculture of the United States has been conducting investigations concerning the influence of geographic and climatic conditions, of cultural practices in the orchard, of commercial methods of picking, handling and shipping the fruit and of conditions in cold storage warehouses, on the keeping quality and ultimate value of the fruit. I will confine my remarks especially to that phase of the storage business which deals with the preparation and the handling of the fruit for storage purposes.

We used to think (and this feeling is apparently still shared by a considerable number of apple men) that the temperature of the warehouse was the one factor that determined the behavior of the fruit in its compartments. If the temperature of the rooms was only cold enough it was expected that the fruit ought to keep under all conditions. When the barrels came out of the warehouse in the spring, slack packed, or the apples were decayed and mussy, or more scab had developed on the fruit than it showed at the picking time, these difficulties and many others were invariably attributed to the faulty management of the warehouse. And the records are replete with claims of the apple men against the warehousemen for cold storage charges and other damages, especially in those seasons when the selling price of the fruit has been lower than they had anticipated.

But, happily for all interests concerned, the handling and the storing of fruit, like the care of the orchard, are being reduced to a scientific basis, and we are coming to appreciate more and more that the warehouse is the last link in the chain of successful fruit growing, depending for its strength upon the character of the management of the orchard, the care in picking, packing, transporting and other handling of the fruit before it reaches the storage chambers.

The cold temperature of the warehouse exerts no mysterious influence upon fruits; it simply retards the ripening processes, and checks, or may prevent, the development of its diseases. A fruit is a living body; it ripens

slowly in a low temperature and quickly when the temperature is high. The diseases spread rapidly in high temperatures, and some diseases, like the apple scab and bitter rot, are checked by the temperature best adapted to the storage of fruit, while others, like the molds which produce the soft brown rot in apples and pears and in some other fruits, and which cause most of the repacking of apples in the spring, grow slowly in the lowest temperature in which the fruit may be stored safely without freezing. The cold storage treatment does not obliterate the differences that exist in the apples when they enter the warehouse; it rather retards, while not preventing, their normal development. If two lots of apples differ in ripeness or in the amount of disease with which they are affected, in the amount of bruising, or if the conditions in which they were grown cause them to vary, cold storage can only check the development of these differences.

Cultural conditions produce an important influence on the keeping of fruit, though this feature is scarcely recognized in practical warehousing. Apples, for instances, that are grown rapidly, and to abnormal size, like those from young trees or from orchards stimulated unduly by tillage and cover crops; fruit produced on quick-acting sandy soils or that from trees bearing a light crop, continues to ripen relatively fast in the storage house, and reaches the end of its life earlier in the season than the same variety when grown more slowly. We have seen such sorts as "York Imperial," "Hubbardston," "Pound Sweet" and "Northern Spy," from young trees, deteriorate from one to four months earlier than the same varieties from older trees. The warehouse cannot be expected to obliterate these inherent differences in the fruit. The grower and the handler should on the other hand, endeavor to acquaint themselves with the influence of cultural conditions on the behavior of the different varieties, and their disposition from the warehouse should be governed accordingly.

We used to think (and this opinion is still commonly held by apple growers and dealers alike) that fruit should be picked somewhat green to insure the best keeping quality. The investigations of the Department have shown this opinion to be erroneous. It has been our experience that the best keeping apples or peaches are those that have attained the highest color and fullest size, but which are still hard and firm when picked. The pear has kept best when it attains full size and is picked before yellowish tints have appeared. In our Fruit Storage Investigation we have observed that after it is picked, green fruit actually ripens more quickly than more mature fruit of the same variety, and the chemical changes have been shown to progress more rapidly by the Bureau of Chemistry of the Department. Green picked fruit, therefore, reaches the end of its life in the warehouse as quickly, or even more so, than the latter. Poorly colored fruit brings the lowest price; it does not attract the consumer; it never acquires that exquisite bouquet, or aroma, or that fine quality that are characteristic of a highly colored, well matured specimen.

Furthermore, the premature picking of the apple makes it especially susceptible to scald. Apple scald is the most serious warehouse trouble in certain varieties like "Rhode Island Greening," "Grimes' Golden," "York Imperial" and "Wagener." It appears to be the result of a ferment or enzyme working beneath the skin. It attacks the apple late in the storage season on the immature or light colored side, and a crop picked prematurely is particularly susceptible to it on account of its green condition. Highly colored apples are less seriously affected, and a crop picked when the fruit has attained full size and deep color may escape the diffi-

culty until very late in the season, provided the fruit is stored quickly after picking, in a low temperature. It is, therefore, in the interest of the long keeping of the fruit, of fine flavor and quality, of a greater commercial value and of a comparative freedom from storage scald, to allow the apple crop to hang on the trees longer than the average apple grower allows it to hang at the present time.

If I may be pardoned for digressing from the discussion of the storage problem and entering the field of orchard management, I would suggest that you consider the advisability of picking over the trees of varieties of fine quality two or three times, taking the fruit in each picking that has attained the highest color. I know of no system of apple culture or of harvesting by which the entire crop of a tree can be picked with a uniform degree of maturity at one time. The apple, like the peach tree, bears fruit that varies several days, or even weeks, in degree of maturity. The fruit on the upper and outside branches ripens first, and the interior, shaded fruit, later, but, by picking such varieties as the "Northern Spy," "Wagener," "Esopus Spitzenburg" and other varieties of fine quality two or three times, at intervals of ten days to three weeks, the general average in size and color of the fruit of the entire tree may be improved considerably. I would suggest also that much of the poor color in apples, especially in old trees under high culture, is the result of the increased leaf surface induced by this treatment. It is probable that this fault may be corrected to a large extent by judicious pruning to let the light and air in to the interior branches.

The opinion used to be quite general among apple men that it was necessary for fruit to "sweat" after picking to give it good keeping quality. It was, therefore, placed in piles in the orchard or in buildings before packing and storing. The investigations of our Department have shown that this opinion is bad in theory and worse in practice. The fruit that keeps the best is that which is stored the quickest after picking; and the fruit that rots the most in the warehouse is that which is delayed in the orchard or under other conditions in transit to the warehouse. I think I am not overstating the actual condition of the fruit-storage business when I say that more than three-fourths of the practical difficulties with fruit in storage houses is the result of rough handling coupled with delaying the storage of the fruit after it is picked. As soon as a fruit is severed from the tree, all of its chemical and physiological activities are accelerated. Now, it ripens with unusual rapidity and most rapidly when the weather is warm. As the fruit is usually moist in the barrels, or in piles, the conditions are favorable for the rapid spread of the diseases. During a delay of ten days in warm weather the fruit may have consumed a large part of its remaining life, and the diseases may have become firmly established before it enters the warehouse. Slack-packed barrels, rotten fruit, and financial loss are the inevitable results of this practice.

Immediate storage after picking is one of the essentials in successful fruit-storage, and then, if the fruit decays, there is a fair presumption that the conditions in which it was grown produced an inherent weakness in it, and that the owner showed poor judgment in holding it beyond the normal storage season of the variety—provided, of course, the warehouse has not been grossly mismanaged.

A farm storage or local warehouse would overcome some of the practical difficulties now experienced in handling the fruit crop. The average fruit grower cannot store the fruit quickly after picking in a distant ware-

house. He does not employ enough labor, nor does he grow sufficient fruit that ripens at one time to make up a carload quickly. A common practice, especially among apple growers, is to hold the fruit in the orchard until a carload is ready for shipment, or the entire crop of fall and winter fruit may be picked before the packing is begun. Under these conditions, the delayed fruit ripens rapidly and the apples enter the warehouse in all stages of maturity and will naturally break down at various times in the storage season. On the other hand, if the grower sells at the harvesting time, he is obliged to accept the price fixed by the temporary condition of the fruit trade. From the business standpoint, it may not be advisable for the average farmer to attempt to store his own fruit and sell it later in the season, but for the specialist in fruit growing, the local warehouse provides a means of holding the fruit in prime condition during the warm fall weather and places him in the most favorable condition to sell it later in the season, either to a buyer or on the general market.

The farm or local storage house is of still greater importance to the grower and shipper of perishable fruits, like the small fruits, the peach and the pear, in providing a means of properly preparing the fruit for long distance shipment. Many of the losses that occur while fruit is in transit are due to the ripening and to the development of diseases that take place before the temperature of the car is sufficiently lowered, either by ventilation or by the melting of the ice. It is not uncommon for peaches to arrive in market with a loss of five to thirty per cent. in the top layers of the car. This is due to the unequal distribution of the temperature in the average refrigerator car and to the small body of ice. From extended experiments in shipping peaches from the south to northern markets in 1904, the U. S. Department of Agriculture found that the fruit could be landed in perfect condition, and that it could be held in the car a much longer period on arrival at destination, when it had been cooled to about forty degrees F. quickly after picking, and before loading in the refrigerator cars. The same principle will apply to the export shipment of peaches, pears and early apples, and to the distant shipment of small fruits.

The principle that we wish to emphasize by this phase of the discussion is that fruits of all kinds, whether they are intended for storage in warehouses or, like the perishable fruits, are shipped to distant markets, need to have their ripening processes checked as soon as they are picked, as the ripening that takes place in the orchard or in transit is at the expense of the keeping quality and value on the market or in the warehouse.

I have left for the last word on the preparation of fruit for storage a phase of the question that should logically precede all others. I refer to the care in handling and preparation of the fruit. This subject has been amply illuminated since the beginning of the discussion of commercial pomology until it would seem to have been worn threadbare. I do not propose to discuss it in detail, except to point out that the most serious rots in northern apples and pears in transit and in storage are often the direct result of bad handling and packing on the part of the fruit grower or dealer, coupled with a delay in storing the fruit, during which time the rots enter the bruised parts and develop. The common soft storage rots of apples and pears, which are caused by molds, do not affect unbruised fruit. They gain entrance only when the skin has been broken by rough picking, or sorting, or by the movement of the fruit in loosely packed packages during shipment, and kill the fruit prematurely. On the other hand, an unbruised fruit lives until it has spent its vital forces through natural chemical and physiological changes, when it dies from old age.

Not in the history of commercial fruit growing has the influence of the careful preparation and handling of fruit on its keeping quality been emphasized as it is at the horticultural exhibit of the World's Fair at St. Louis. Several of the States have kept the tables well supplied with magnificent apples of last year's crop throughout the Exposition. The principal part of the fruit exhibit to September 15th was made up of fruit of the crop of 1903. There has been a wide variation in the keeping quality in the fruit from different States, and, in my judgment, this variation is due more to the preparation of the fruit for storage than to the conditions in the particular section in which the fruit was grown. We do not underestimate the influence of geographic and climatic conditions on the keeping of varieties, and we do believe that the success that is achieved by the various localities in showing their fruit products at the Exposition is due not only to the natural resources of the locality, but even more to the skill and care of the men who have handled the fruit from the tree to the show tables. A similar exhibit of storage fruit could not have been made at the Columbian Exposition in 1893. The progress since then has been made not so much in the methods of cold storage, but we have learned in the meantime that fruit should develop full size and high color before picking, that in all of the handling it should be treated like a delicate living body, that heavy wrapping protects it from bruising, that it should be packed in small packages, shipped immediately to a warehouse and stored in a temperature of 29 to 31 degrees F. We need to apply the lessons of this great Exposition to the handling of fruit for commercial purposes.

Q. In wrapping apples to be placed in cold storage, would you advise that they be cooled in very hot weather before they are wrapped?

Mr. Powell: I have not made any tests of that kind, but should think it would hardly make any difference if you can get the wrapped fruit into cold storage quickly. In wrapping for storage for long keeping, the thicker the wrapper, the longer the fruit will keep. For that reason double wrapping is desirable under such circumstances.

Mr. Macoun: Regarding the keeping quality of apples from old and young trees and from trees that have been severely pruned, it has always appeared to me that in some parts of the country pruning has been practised to too great an extent among the best orchardists. In my opinion, pruning is one of the least essentials, and that cultivation and spraying are of far more importance. If a tree is properly started and has a symmetrical head, when it begins to bear, provided it gets a little pruning to keep it in shape, it will develop in such a way, with proper cultivation and proper spraying, that the fruit will be evenly distributed over the tree and get the light and air properly. Orchards treated in this way will produce fruit with the keeping quality Prof. Powell has spoken of, although the fruit may not be very large.

A Member: I should like to take very strong objection to Mr. Macoun's statements. I have had considerable experience, and find that severe pruning adds to the keeping qualities.

Q. What is the effect of fertilizers on the keeping qualities of the fruit?

Mr. Powell: Fertilization or any other factor that induces an abnormally large growth reduces the keeping quality. But I do not wish to leave the impression that I do not recommend high cultivation and high fertilization; I would rather have more fruit of a fine quality, even if it did not keep quite as well, than inferior fruit with better keeping qualities.

Mr. Caston: The kind of fertilizer no doubt has a bearing on the keeping qualities of apples. It seems to me that the fertilizing ration should be properly balanced.

Mr. Morris: If you feed an orchard bone and potash, you get quality and color without ruining the keeping qualities. Too much nitrogen will affect the keeping qualities adversely.

THE TRIAL SHIPMENTS OF FRUIT TO WINNIPEG.

By Prof. J. B. Reynolds, Ontario Agricultural College, Guelph.

The object of these experimental shipments of fruit to Winnipeg was to find out whether or not tender fruits from Ontario could be placed in good condition on the Winnipeg market by freight carriage. Incidentally it was the intention to inquire into the whole matter of transportation, prices, and selection and packing of fruit, as well as the best construction of car for refrigeration.

In each car were carried apples, Bartlett pears, grapes, plums, peaches and tomatoes. The idea seemed to prevail among most of the fruit growers that in order to carry these fruits to Winnipeg safely they must be picked green and hard. The result does not justify this belief. A considerable proportion of the peaches were packed hard, green and undersized. A fair quantity of them, however, were, when packed, well sized, well colored, and firm, in such a condition as No. 1 Crawford peaches are packed for use within a few days. These last were by far the most desirable when opened up at Winnipeg. In fact, after seven days had elapsed between loading and unloading, after a journey of 1,500 miles, and various shuntings at Allandale, North Bay, Fort William and Winnipeg, Crawford peaches were placed on the market from our shipment in better condition than any I have seen displayed in the shops in Guelph.

This is true not only of a chance few of the peaches shipped, but of all that had not been picked too green. A box of the primest of these peaches found its way into the hands of an acquaintance of mine, and on Monday, three days after the sale and eleven days after picking, I inquired as to the condition of the fruit. The reply was that a few only of the peaches were then mellow enough for immediate use, and that the greater part of the box could be kept until the end of that week, that is, until fifteen or sixteen days after picking. Grapes shipped well, some of the Moore's Early only being off the stem. The varieties of plums were Reine Claude, Yellow Egg, Columbia, and Grand Duke. These were beginning to soften, but were in good condition when sold. Of Bartlett pears the same may be said as of Crawford peaches, most of them were shipped too green, and those that were allowed to reach good size, and yet were picked firm, arrived in prime market condition.

Various causes contributed to these gratifying results, and the only accidental one was the weather, which was favorably cool. All other contributing causes were anticipated in our plans for the shipment. These were: A selection of good fruit, careful wrapping of peaches and pears, and packing in suitable carriers, boxes for everything, and for grapes and plums a bushel crate containing twelve trays, each tray holding about two and a half pounds; careful loading in the car, so that none of the boxes could move out of its place, and spacing the boxes so that air could circulate on all sides of each box.

As to cold storage facilities: Two cars were selected of quite different interior construction, the one having devices for maintaining air circulation, the other having none of these. It is probable that with warmer weather a defective system of refrigeration would have been detected, but the uniformly cool weather during the shipment made both cars equally effective. Upon this matter, therefore, the experiment is inconclusive. It must be borne in mind that the office of a refrigerator car is to counteract the effect of warm weather upon perishable goods. In a good refrigerator, fruit will keep as well in warm weather as in cold. Provided our cars were good, the success of our shipment did not depend upon the weather.

The Prices Realized.

As to prices: Both cars were sold by auction, one on September 22, the other on September 23. The prices on the first day were: Crawford peaches, $1.10 to $1.25 per box of 12 quarts; plums, $1.50 per crate of 20 quarts; grapes, $1.50 to $1.80 per crate of 30 pounds net; pears, $1 to $1.25 per box, half bushel; apples, 85 cents to $1.25 per bushel; tomatoes, 55 cents to 85 cents per 12 quart box. On the second day there was rather an overload of pears, which went low accordingly. Prices were: Peaches, $1.10 to $1.25; plums, $1.05 per crate of 13 quarts; pears, 70 cents to $1.05 for XXX Bartlett. Flemish Beauty and XX Bartlett sold much lower. Apples, 85 cents to $1.20 per bushel; tomatoes, 55 cents to 60 cents per 12 quart box.

Average net prices, including cost of package, but after deducting freight and commission charges, were: Peaches, 93 cents per box; plums, 75 cents per 13 quarts; grapes, $1.14 per crate of 30 pounds net; pears, 75 cents per box; tomatoes, 44 cents per 12 quart box; apples, 55 cents per bushel. In replies received from the growers who supplied the fruit, most of them express satisfaction with these prices. In the instance of plums and peaches prices are ruling high in Ontario this year, and the Winnipeg prices are not relatively high. It is satisfactory to know, however, that the peaches, sold on their appearance simply, without any reputation to help them, realized fully as much as the best California peaches on the same day. The auction method is liable to be panicky, but is on the whole, perhaps, as good a method as any for disposing of perishable fruits.

Should Watch These Points.

While our experiment was highly successful, I do not advise shippers to repeat it until they are fully apprised of the importance of attending to details, selecting the fruit at the right degree of maturity, packing and loading properly, keeping the car iced while loading, and filling bunkers before it starts, and marking way bill so as to insure re-icing in transit. With one exception I found that the various icing stations attended well to the icing. With increase of business, so that the icing of cars becomes a regular instead of an occasional duty, there is reason to expect that it will be better attended to in future. The same is true of despatch. A large volume of freight business in perishable fruits is therefore likely to correct present deficiences in the transport system. But with the fruit growers and shippers nothing less than co-operation in packing and shipping will remove the defects in that part of the undertaking. There must be uniformity in packages, in grading, in quality of fruit, and these cannot be secured by independent action but only by co-operation.

Prof. Hutt: We all realize that there is a vast market for our export fruit in the North-west. These shipments have demonstrated that fruit can be shipped there in proper condition. But we learn much more than that from these shipments. The fruit that was too green when loaded, did not sell well. I saw all the fruit loaded, and examined it with Mr. Carey. Much of what we thought was too ripe to carry that distance seems to have sold the best on arrival. We learn from this that we have been shipping our fruit too immature to arrive in the best condition. That fact is brought out not only in connection with peaches, but with Flemish Beauty pears. One grower put up 100 cases of these pears, and if they could have been kept for a month longer, they would have brought much better prices.

One of the most striking things we noticed was the great lack of uniformity in grading and packing. Our competitors in the North-west markets are the men of California and British Columbia, where so much progress has been made in this direction. Although they may be handicapped for rates, they are away ahead of us in this respect. We happened to have a California shipper with us at the time one of these shipments was being made. After examining the packing, he said he was not a bit alarmed about competition from Ontario.

This difficulty would be overcome largely by co-operation. Until our growers co-operate and put up a uniform package with uniform grading, we shall not be able to gain a place on that market and retain it against our competitors. Prof. Reynolds appears to think that the experiment could not be repeated except under favorable conditions. I think we could make the conditions far more favorable with the experience we have gained and get even better results. I hope to see these shipments followed up in a commercial way next season.

Mr. Bunting: You speak of lack of uniformity in packing, do you mean that the packing as a general rule was improperly done? My understanding of Prof. Reynolds was that, while some of the fruit was not packed as it should be, the great proportion of it was well packed.

Prof. Hutt: I suppose that the greater part of the fruit was well packed, but some of it was very improperly packed. Nor was it properly graded; no two shippers seem to have the same idea of what constitutes No. 1 and No. 2 grade. Some of the fruit had to be graded down. By a co-operative packing house all this could be overcome, as the fruit would be packed by experts and have a uniform standard, and buyers in any market would know just what was meant by XX and XXX fruit.

Mr. Huggard: Is it possible to ship Bartlett pears in quantities of ten to fifty bushels, at the regular rate of freight charges, and obtain a reasonable profit?

Prof. Reynolds: On the first day and on part of the second day the sale of our No. 1 Bartlett pears realized from $1.05 to $1.25 per half bushel. On the second day prices were lower for reasons explained.

Mr. Bunting: Before the recent concession was made by the railways, pears in boxes or barrels in less than car lots would have been charged for at the rate of $1.24 per hundred from the Niagara District to Winnipeg, and 80½ cents in car lots. Under the present arrangement, the rate for car lots is 55 cents, and for less than car lots 80½ cents. I presume that from Mr. Huggard's district the rate would be slightly higher.

I think that in shipping car load lots by freight the delays might be quite serious, and I do not think it would be desirable to take the risk in the warm part of the season at any rate.

Mr. HUGGARD: I shipped from our station to Montreal, Ottawa, and Midland this season, and the agent said he had received no instructions to make any difference in the rates.

Mr. BUNTING: Did you ship in car-load lots?

Mr. HUGGARD: No; not in pears.

Mr. BUNTING: There is no reduction except for 10,000 pounds or over.

Mr. HUGGARD: The last shipment I made was of 14,000 pounds of pears to Ottawa, and no difference was made in the rate over last year.

ALEX. MCNEILL: Mr. Hilborn, who is a gentleman who ships largely, sent a shipment of early tomatoes to the North-west, and sent them the only way they could be sent in less than car load lots—by express. He had to prepay the charges which were $149. They arrived in good condition, everything first-class, and they realized what was regarded as a good price, the returns being $112. You can calculate how long it will take him to get rich at that rate. He also had to pay for packages and a lot of other things. That demonstrates the fact that we shall have to get the express business put in better shape. Our work is not half done.

There is a point in connection with the shipments made by Prof. Reynolds that I wish to emphasize, that we as fruit growers have a duty to perform, and it ill becomes us to take the beam out of the other fellow's eye before we get the mote out of our own.

The transportation companies are not doing their whole duty, but how about ourselves. On these very experimental shipments, which were generously provided for by one of the best Ministers that ever administered a department, what did we do? There are two reports in the archives at Ottawa under the Fruit Marks' Act which should have been prosecutions, where the shippers had marked xx fruit as xxx. They were old shippers, and had they been treated with anything but leniency, they would have been before the police magistrate. That is a disgrace, and the time has come for plain speaking. This is not the first time that such a thing has happened. Frequently public spirited men have been repelled from assisting us because we have not done our own duty. The time has come when we must second the efforts of those who are endeavouring to help us. I dislike to speak of these things, but I feel that I owe it to the fruit industry, an industry which is being seriously jeopardised, either by the gross carelessness of the growers or by something worse.

To show the necessity for such work as is being done by Prof. Reynolds, we had a conference with the dealers in Winnipeg last August. They told us in the plainest manner possible that they did not want our stuff. They said "We will take your apples, pears and grapes, but keep your other stuff in Ontario." If that had been in Great Britain, we should have said that they were prejudiced against colonials. I reminded them that from a patriotic point of view they ought to patronize native products. They said. "Patriotism is all right enough, but we can get better stuff than your people supply." I said: "Does not the duty interfere with fruit coming in from the South?" They replied, "What does that amount to anyway? We have the money and are willing to pay for the right article." It is a purely business proposition with them; they can get something that suits them better, and they are not handling our fruit. I said, "Why don't you come to Ontario and show us what you want?" and their reply was "Don't we tell you in the prices we send you for your fruit?" What more could I say?

The lesson is that there are three weak points, first, the grower, who has to do the growing, packing and grading; second, the transportation

companies, who have the chance to take just what slice they please out of the profits; and third, the dealer at the other end, who is a thousand miles away from us, and can manipulate things very nicely.

I think the Department has taken a long step in helping the fruit growers to help themselves; but we want united effort to get after the transportation companies. We have only just started on the question and require to follow it up.

Robt. Thompson, St Catharines: While I was in Winnipeg I discovered that, while the dealers were returning only sixty cents per basket for grapes to the growers in Ontario, the buyers paid 75c. to 80c. for the same grapes.

The same thing applies to No. 1 and No 2 fruit. I know of a case where a car of pears was sent to the west, and when the returns were made to the shippers they were so unsatisfactory that enquiry was made into the matter, and the commission men finally admitted that they never saw this individual shipment, but took up the manifest, and sent "What they thought was fair" to the shippers, which as a matter of fact was halfprice.

Mr. Haynes: I should like to ask Mr. Reynolds whether he has any report of the goods that went from St. Catharines in basket form? I should like to see a comparison between fruit shipped in baskets and that shipped in the ordinary manner as prescribed by the Department?

Prof. Reynolds: These grapes were all put up in from four to nine pound baskets. They were placed at the top of the packages without being weighed, and they carried in good condition. The only objection to baskets is that they will not support a load when it is placed upon them.

Mr. Haynes: We have shipped large quantities in baskets and have realized good money. I realized more money for them in Ottawa than in the West. The finest fruit was selected and put in cases, and the balance in baskets. The trouble with the dealers in the West is that they will not handle our goods other than on commission; they should come here and buy from us.

W. L. Smith, *The Weekly Sun*: The fruit inspectors are doing good work in seeing that the fruit is packed honestly. I think they could also do good work in seeing that the commission men make proper returns, and that it should be part of their duty to investigate such cases as Mr. Thompson has mentioned.

Mr. Armstrong: We all realize that the average fruit grower has not attained perfection in any department, but it is well known, not only in Toronto but in many other cities in Canada, that there are quite a number of fruit growers who pack their fruit perfectly. We have already received statements from various points from the consumers saying that our packing is equal to anything they have seen, not excepting California packing. I do not take much stock in importing experts from California to teach us. There are a large number of fruit growers who are simply farmers who have added this department to their work. The real fruit grower is handicapped by them. In this case, co-operation in picking and packing is the only remedy. Let there be proper inspection at central points to see that packing is properly done, especially when fruit is shipped to Winnipeg.

W. W. Moore, Chief of Markets Division, Ottawa: Was any difference discernible in the condition of the fruit out of the two cars? Did the Hanrahan car carry better or worse or how?

PROF. REYNOLDS: There was no difference. The uniformly cool weather allowed each car to carry very successully. How hot weather might have affected results I cannot say.

J. H. SPARLING, District Supt., Canadian Express Co.: We do not operate in the direction of Winnipeg, but we operate to Halifax in the East, which is about the same distance. Our service is much faster than freight, and we do not ship in refrigerator cars, but in what are called iced-cars. These are ordinary express cars with an ice box at each end and a false roof, so as to admit of the air circulating properly. The time to Halifax is about 50 hours. We find that all classes of fruit can be handled satisfactorily in that way. In 1903, large quantities of strawberries were shipped to the lower provinces, and I believe the growers made large profits.

Five or six years ago we undertook to haul north-west fruit by way of Chicago and St. Paul. But the cars usually got damaged, and had to remain over for twenty four hours at those points for repairs, and the result was that the fruit arrived in rather bad condition. We had such bad luck with cars breaking down that we gave up the idea of shipping to Winnipeg.

C. E. DEWEY, Division Agent, G.T.R. System, Toronto: I have listened with much interest to Prof. Reynolds' account of his experiments. I have not the particulars of the time made on these shipments. Generally speaking, I can only say that the railway companies are very anxious to do what they can to assist in developing this trade. We appreciate the fact that Winnipeg is rather a long way to send tender fruit, but at the same time we want to do what we can to help. We have been negotiating with the fruit men lately through our mutual friend, Mr. Bunting, and I am safe in saying that the understanding between us is better to-day than ever before. Regarding Mr. Huggard's complaint as to overcharge on pears, if he will let me have the particulars, I shall be very glad to look into the matter, and if an overcharge has been made to refund it.

G. E. GRAHAM, Supervisor of Refrigerator Service, C.P.R.: Our refrigerator cars are equipped with the Bohn system. The Santa-Fe people, who have the largest number of refrigerators on the continent, have adopted this system. We have found it gives excellent results. Our company is paying special attention to this refrigeration work. This season up to date, we have sent to the North-west 650 cars of Ontario fruit, and only three complaints have reached me so far that the goods arrived in poor condition. One was the case of a car shipped from Port Dalhousie. There was no ice at that point, and the car was not cooled, and was not iced until it got to Hamilton. The result was that when the car arrived, the contents were slightly overheated. The two other cases were of cars shipped from points in Eastern Ontario. We made enquiries and ascertained that the cars had endorsed thereon that they had been iced at shipping point and were not to be iced in transit.

Our Company is trying to co-operate with the fruit men in these shipments, feeling confident that all classes of fruit can be landed in Winnipeg in good condition.

W. H. BUNTING: Our Canadian refrigerator cars compare favorably with anything we saw during our recent trip of inspection to the United States. Our cars are of newer construction, and, generally speaking, are much better. This year in connection with some shipments I made to the North-west, I had a service of a little less than six days from St. Catharines to Winnipeg. I have no doubt that when this business is gone into more

extensively, the railway companies will be able to guarantee a time limit on shipments, barring unforeseen accidents.

D. D. Wilson, Seaforth: The fact that the fruit was such a long time on the way and yet arrived in good condition proves positively that it can be succesfully shipped to Winnipeg by freight. My experience has been far more favorable in shipping to Winnipeg. I shipped a car of eggs from Seaforth the other day, and it was in Winnipeg in four days. I also had a car of apples landed there in five days, which was just the other day. With proper care and attention in packing and marketing, there is a large business to be done in the North-west, and it is growing very rapidly.

THE CONDITION OF OUR EXPORT TRADE IN CANNED GOODS WITH GREAT BRITAIN.

By W. P. Gamble, Ontario Agricultural College, Guelph.

Anyone who has followed the development of export trade must realize that we have an invaluable market in the mother country. But many fail to appreciate the fact that in order to establish a sound business with Great Britain we must supply her merchants with goods of the very best quality. The average English consumer does not consider the cost of household commodities so long as his taste is gratified; but he strongly objects to paying even a very low price for an inferior article. The price paid for Canadian cheese and butter illustrates this fact very well. In the case of cheese, there is a large and growing demand for this article in England; whereas, at the present time, there appears to be a very strong prejudice against Canadian butter. It is gratifying to know, on account of the large manufacture of cheese in Canada, that our output receives such satisfactory mention by leading merchants in London, Manchester, and other large centres. At the same time, it should be a matter of sincere regret to all true citizens of Canada that our export butter does not reach to the same degree of excellence. Every effort should, therefore, be put forward to place our butter on the market in a condition such that it will command the highest price. The difference in cost of manufacture and proper handling of this perishable product of the farm would be practically nil as compared with the enhanced price which it is possible to obtain.

What has been said of our cheese and butter applies in a general way to our canned goods trade. It was with the object of obtaining some reliable information along this line that the writer, during the past summer, visited a number of the leading wholesale houses in the Old Country.

Canned Peaches, Pears and Apricots. A number of the wholesale houses did not handle Canadian canned goods at all. In other houses where our canned goods are to be found the general complaint was that our peaches, pears, and apricots are pulpy in appearance. When our cans were opened and compared with those sent from the United States the difference was very marked. The fruit from the other side of the line retained its perfect form, and was certainly more attractive than ours, half of which was in pulp and had more of the appearance of boiled turnips than of fruit.

The general impression among the merchants appeared to be that our manufacturers purchased the fruit after it had become too ripe, or else that a very inferior variety of fruit, such as windfalls, etc., was used. Notwithstanding this fact, the flavor of our canned peaches was excellent, in fact

much superior to that of the California fruit. The general concensus of opinion appeared to be, however, that Canadian manufacturers must look more closely after the raw material if we are to have a leading place in this very important industry.

Canned Raspberries. The writer was shown a very fine display of canned raspberries. The fruit was put up in glass sealers, which were neatly labelled. This particular kind of fruit presented a very attractive appearance, and sold readily at good prices. In speaking of this fruit, Mr. Robinson, of the firm of Hanson, Son & Barter, said: "We cannot get enough of your canned raspberries to supply the demand. We have had to cancel a large number of orders for this brand this season. Our customers say the fruit is excellent. If more of your fruit could be put in glass the prices paid would certainly be much higher than they are at present."

Canned Tomatoes and Corn. There is a steadily growing demand for tomatoes and corn in England. Some few years ago there was a decided prejudice against canned goods of any kind, the reason being that a few cases of poisoning supposedly resulted from eating such goods. This prejudice appears to be gradually dying out. But there is a complaint at the present time that our manufacturers are not sustaining their record in the matter of quality. One defect pointed out to me was a blackening of the corn at the top of the can. This was probably caused by the soldering iron scorching the corn during the process of sealing the cans. In contrast with the black surface exposed when a can of Canadian corn was opened, several merchants showed me how the American manufacturers overcome this difficulty. They place a clean piece of parchment paper over the corn, and in this way are able to obviate any blackening of the canned goods. One dealer told me that he did not so much object to a little of the corn being blackened, but it gave the customers a bad impression of the goods to see this black surface when the can was opened. The customers often mistake this blackening of corn for foreign matter, and very strongly object to it. A little care in sealing the cans and a small piece of parchment paper placed underneath the lid prevents any such false impression.

Canned Peas. There is a very limited demand for Canadian canned peas on the English market, mainly, for the reason that most of our peas are white. The most of the peas sold in England come from France, and are colored by the use of a dilute solution of copper sulphate. I may further add that the canned pea trade in Great Britain at the present time is in a very unsatisfacory state, because of a law prohibiting the use of copper sulphate in any process of manufacture. The merchants say that it is absolutely impossible for them to sell canned peas unless they are colored, and it is practically impossible for them to obtain sufficient peas to supply the demand of their customers unless they are permitted to sell peas which have been colored by copper sulphate solution. Several merchants have been fined for selling such goods, and a number of cases are now before the courts pending the decision as to whether or not a small percentage of copper sulphate may be used in the process of manufacture of this particular article of food.

Canned Beef and Tongue. Some of our Canadian manufacturers have the reputation, in this particular line, of putting up a first-class article. In other cases the complaint is made that our canned tongue cannot compare with that placed on the market by Chicago firms. The main points of excellence in the American canned tongue appear to be: first, the neat attractive labels on the cans, second, a more attractive appearance of the tongue when

the can is opened, and third, not so much of the throat of the animal is left attached to the tongue. From the English buyer's standpoint the tongue shoud be freed from all appearance of the throat or gristle. The writer was shown several of these cans opened, and in some cases the complaint is quite justifiable.

In conclusion, let me say that I believe there is an excellent market for canned goods in England. From what I was able to gather from conversation with prominent and reliable men in the business, I believe that it is possible for Canadian manufacturers to develop a very profitable business along this line. But in order to achieve the highest degree of success we must pay special attention to the following points: Our goods must be put up in the most attractive style. The cans must be neatly made, and the labels must be placed properly on the cans. (Appearance counts for a great deal in England). The goods exported must be of the very best quality if we are to compete successfully with our American neighbors. The goods should also be packed so as to prevent, in so far as possible, any injury to the cans. A final point, which of course is demanded in all lines of business, is to fill all orders promptly.

I may say further that, in developing this trade, I believe the very best and most economical method is for our manufacturers to send forward samples to some reliable merchant, and have him report upon their quality and suitability for the English market. There is absolutely no use in sending over goods that will not command a price, and moreover they give a bad impression, and when once the consumer is prejudiced, it is difficult to overcome it. The goods are examined on reaching England for bruised or damaged cans, and care in packing is therefore necessary.

Alex. McNeill, Chief of Fruit Division, Ottawa: This is an exceedingly valuable paper. There never was a great industry built up where absolute honesty was not practised. The Englishman, from his love of justice, has been able to impress himself on the civilized world. He is a thoroughly honest and reliable individual; he is here to-day and to-morrow and is always the same. Hence he is the commercial giant of the age. Let us apply the lesson to ourselves. Out of 32 samples of canned Canadian fruits, as you will see by the Government reports, 24 were found to be adulterated. There is little use our trying to build up a trade in that way. The first thing we have to do is to clean out our own stables. Let us demand of the canners that this practice of adulteration be discontinued. I also suggest that we ask consideration for our own home market. It is due to the fruit growers that the Canadian public should get what it wants. It is a disgrace to put such goods on the English market, and it is still greater disgrace to offer them for home consumption.

Q. In what way were they adulterated?

Mr. McNeill: In various ways. Some with nothing more harmful than glucose; some with pulped apples and turnips. When say, strawberries are scarce and apples are plentiful, they take pulped apples, and strawberry extract, and timothy seed to represent strawberry seed. It is in the interest of the fruit growers that this kind of thing should not be permitted. They also use aniline dyes for coloring. Our manufacturers with whom I have discussed the matter say that they cannot compete with British manufacturers of jams and jellies until we can get free sugar, and establish a reputation for our goods. I am happy to say that free sugar can now be obtained for that purpose—that is to say, there will be a rebate allowed to export goods. Of course this excites the envy of the Canadian

who thinks he has to pay full price, while the Englishman can get the goods with the rebate off. But I see no reason why the manufacturer should not put up a pure article and make such an article as the people demand.

Prof. Harrison, Bacteriologist, O.A.C.: We have analyzed during the past season a large number of varieties of canned products, such as, peas, tomatoes, corn and apples. These goods were what the canners call "swells," that is to say, the tins were bulged at the ends. In the majority of cases, the swelling of the can was caused by the growth of micro-organisms which were not killed by the sterilizing process. With canned apples, however, a careful examination of the fruit and juice failed to reveal any micro-organisms, and hence the swelling of the can must have been due to some other cause. Whilst not absolutely sure, we think that a reasonable explanation of this matter is that the apples in the can retain a small amount of air which is not driven out by the sterilizing process. After the can is closed, an interchange of the contained air in the cells of the apples and the juice in the can takes place and the ends of the can become bulged. If these cans are carefully punctured, taking precautions to prevent the ingress of air, and again resoldered, they will keep without further swelling.

Mr. Gamble has already told you that the English market requires a green pea, and that the peas canned in Ontario are not vivid enough in color. It is impossible to get the color that the English market demands unless copper sulphate is added; but, by adding this chemical, the canner becomes liable to a heavy fine. One of the latest developments in the pea canning industry is the introduction of a machine called a "viner," which takes the whole plant and threshes the peas directly from the pods. Since the introduction of this machine, it has been found much more difficult to sterilize the peas, and the reason for this is that the peas become surrounded with a good deal of dust which contains the spores of micro-organisms very resistent to the sterilizing process. On account of the presence of these resistent spores it is more difficult to can peas successfully than it was formerly when the pods were hand-picked off the vines. Peas shelled by the viner machine require a higher temperature to sterilize them, and this higher temperature is apt to destroy their color. More investigation is needed to ascertain the best temperature for destroying these resistant spores which may be found upon the peas, in order to obtain a satisfactory product of whole peas, not ruptured or broken by the sterilizing process, bright in color, and with a clear juice.

A number of factories have complained recently of the quality of the tin-plate used in manufacturing the cans. Many export cans are not sufficiently strong to stand the rough handling they get, and various fruits and vegetables contain acids which have an effect on the tin coating of the cans. When the plate is not well coated with sufficient tin, the acid very quickly eats through the iron portion of the can and if a minute hole is made, the contents of the can are soon spoiled. In conjunction with the Chemical department of the College, we hope to conduct some experiments as to the minimum amount of tin which should be used on the cans employed for various fruits and vegetables.

In the work that we have undertaken, we desire to have the co-operation of the canners and growers, in order that we may put to a factory test the results of the smaller tests made under the more exacting experiments of the laboratory.

THE BLACK ROT OF GRAPES IN OHIO.

By Prof. W. Lochhead, Ontario Agricultural College, Guelph.

At the request of the Ministr of Agriculture, I recently visited the grape districts of northern Ohio to ascertain the best methods of dealing with the black rot of grapes. In Ontario, in the Essex district, black rot has been more or less prevalent for some years, but no sustained effort was made to check the progress of the disease. The result was that fruit growers of that district found it necessary to pull out the vines and plant to other uses. Many of the old vineyards which were objects of pride five or six years ago along the Detroit river have now disappeared. In the Niagara region, where the grape industry is developing on a commercial basis, the black rot is beginning to be felt, and grape growers fear they will suffer the same fate as the Essex growers if they do not try to combat the attacks of the fungus.

Through the kindness of Prof. Selby, of the Ohio Agricultural Experiment Station at Wooster, I was directed through the vineyards along Lake Erie from Unionville on the east to Sandusky on the west. Besides, he gave me letters of reference to many of the prominent owners of vineyards in the Cleveland district, with whom I consulted regarding their methods of treatment. The results of the experiments these growers have conducted have been very gratifying. They were conducted on the co-operative plan, that is, the owners and the Experiment Station worked together to control the disease.

Six sprayings are recommended by Prof. Selby for the Delawares, seven for Catawbas, and eight for the Concords. He states that the Catawbas and Niagaras are the most susceptible to rot; the Delawares quite resistant; and the Concords not so susceptible as the Niagaras, but less resistant than the Delawares. He does not believe that early sprayings are of much use, and he bases his belief on the results of sprayings carried on for three years.

When Sprayings Should be Done.

The first spraying is given when the new shoots are from one to two feet in length, which in the Ohio district is about June 1; the second spraying is applied about July 1 in an ordinary season. These two sprayings are considered the two most important, inasmuch as they come immediately before and after blossoming. Many of the grape growers told me that if they failed to spray on or about July 4 they almost invariably lost their grapes. The subsequent sprayings are given at intervals of a week or ten days, and the last for the Delawares is usually applied about August 1. The first four applications are made with Bordeaux mixture, and the remainder with either ammonia-carbonate solution or soda-bordeaux,

This question has been studied very thoroughly by Prof. Selby for the last three or four years, and he is of the opinion that grape rot will always be more difficult to control on sandy, open soil than on the heavy clay soil in the Cleveland region. In Ohio the fruit growers use their sandy, open soils for other purposes than grape culture, and there the rot is less severe on the heavy clay soils.

There are so many evidences of the good results of careful spraying, according to the recommendations given by Prof. Selby, that no further experimentation along the line of prevention of grape rot will be undertaken at present. He is satisfied that the methods in use at present will con-

trol the black rot every time. I may add that vineyards which were left untreated, or not carefully treated, show either total losses or a very large percentage of rotten grapes. Even the most careless of grape growers in the Cleveland region have come to the conclusion that they must get out of the business, or spray according to the formula given them by the Experiment Station, and which I have outlined. By the way, Prof. Selby does not think much of the dust sprayers, and he is a strong believer in the use of the liquid Bordeaux as a fungicide, which he considers a fungicide par excellence.

There is no doubt that the black rot can be kept in check in Ohio, but it remains for us to prove that it can be held in check in Ontario. It appears that one of the best means of preventing this disease is to burn all the "mummy" grapes which would naturally remain on the vines all winter. These are probably the source of the contagion for the coming season, and too much care cannot be taken to have all such diseased grapes destroyed.

An important point that must be taken into consideration by grape growers is that the black rot is a very difficult disease to control, and that two or three sprayings are not sufficient. It takes six or eight sprayings to keep the disease completely in check and to get perfect grapes. As we know that Bordeaux will discolor the grape when it reaches a certain size, it is well to spray with the soda-Bordeaux or the ammonia-copper-carbonate solution for the last two or three sprayings. It remains for the Ontario growers to show that the black rot can be controlled in their own country under slightly different conditions from those obtaining in Ohio.

DISEASES OF THE GRAPE IN ONTARIO IN 1904.

By W. T. Macoun, Horticulturalist, Central Experimental Farm, Ottawa.

Knowing that rot was causing serious damage in a number of vineyards in the Niagara peninsula, I took an opportunity during September, to visit some of them in the hope of learning facts of value in regard to the diseases of the grape. Accompanied by Mr. W. H. Bunting, of St. Catharines, I visited his vineyard and others in the neighbourhood of St. Catharines and found that Mr. Bunting had sprayed seven times and his fruit was only slightly injured.

When the grapes were the size of peas Mr. Bunting had bagged 1,000 bunches in order to find out if infection took place before that time. Most of the bunches thus bagged were perfect, but some had the black rot in various stages of development, showing that infection had taken place before the grapes were as large as peas. The Niagara grape was the variety most affected. Several vineyards of Concord near Mr. Bunting's were examined, but black rot had not worked to any extent in them. Brown rot was, however, found in one vineyard, but had not done much injury to the fruit. Another vineyard, containing about 15 acres, was visited, consisting principally of Concord, Brighton, Niagara, and Moore's Early. Of Niagara and Brighton there was scarcely a sound grape anywhere, and none of the bunches of Concord, even with manipulation, could be made fit for market. Moore's Early was not affected. This vineyard had not been sprayed.

The infection by the black rot as it appeared in the vicinity of St. Catharines was first noticed on the fruit as a round, brownish spot about the size of the head of a pin. This brownish appearance gradually spread over the

surface of the berry, and by the time one-third of the surface was covered the original brown spot had become paler, showing distinctly the mark of infection. After the whole grape became brown, the tissue gradually shrunk and dried, and when thus shrunken the fruit appeared black and prominently and irregularly ridged, the surface being covered by small black postules.

The Brown Rot.

The vineyards of Mr. Murray Pettit, of Winona, Ont., and others in that vicinity were also visited. No black rot was noticed at Winona, but brown rot was quite abundant, and while it had not caused such damage as the black rot, it had done considerable injury. The leaves of the vines affected with brown rot had a downy appearance underneath. The affected fruit first showed a brownish spot or patch on one side and a shrinking of the tissue. The brownish appearance spread all over the grape and the whole grape eventually shrunk into a hard shrivelled mass. When badly affected the vine loses a large amount of foliage. Powdery mildew was also found in these vineyards.

The Niagara grapes, both in Mr. Pettit's and adjoining vineyards, were affected this year with either a new disease or more probably, as Prof. Selby suggests, a condition caused by either powdery mildew or brown rot affecting the stem to which the grape is attached. This disease causes a hardening of the grape, and gives it a pale, unhealthy color.

Another disease of the grape which was doing a great deal of injury at Winona was what we took to be the grape-leaf blight, a disease which has not received the attention that it deserves. This blight causes the leaves to wilt and drop, thus preventing a free circulation of sap and the proper development and maturing of the fruit.

Persistent Spraying Required.

The diseases of the grape can be controlled by thorough spraying, but the work must be done persistently and carefully. The following are descriptions of some of the most injurious diseases of the grape in Canada with the best remedies known:

Anthracnose, Bird's Eye Rot, Scab (*Sphaceloma Ampelinum*). This is the only grape disease which has given any trouble of the Central Experimental Farm. It is difficult to control by spraying, but fortunately, only a few varieties have been affected, Lindley being the worst. This fungus attacks leaves, stems, and fruit, but it is on the fruit where it is most noticed. The disease is apparent in depressed patches extending along the stems, which checks the growth. There are also reddish brown patches on the leaves.

The stems of the clusters of grapes are frequently affected, and when the disease occurs there, the fruit remains green and eventually withers, making an imperfect bunch. The disease on the fruit occurs in roundish brown spots with a purplish margin, giving somewhat the appearance of a bird's eye. Frequently spots unite and form a large irregular area. This is a very difficult disease to control, and though spraying with Bordeaux has not checked it to any extent, spraying before the buds open, before blossoming, after fruit has set and ten days later with Bordeaux mixture, is recommended.

Black Rot (*Laestadia Bidwellii*). Up to recent years, this disease was thought to have reached its northern limit south of Lakes Erie and Ontario.

but during the last few years in Essex county, and more recently in the Niagara peninsula, it has caused much damage. The appearance of this disease has already been described, but something further may be said regarding it. The spores live over winter on the vine and in the affected grapes, and germinate when growth starts in the spring. The disease attacks the leaves and shoots, the leaves showing the disease in roundish reddish brown patches and on the stems, small, long shaped, dark, brown, slightly depressed spots, on the surface of which appear the characteristic pustules of the black rot.

When conditions are favorable, the disease only requires 8 to 12 days from the time the spore germinates until the mycelium has run its course through the fruit and has produced new spores. Before the grape shrinks much in size the mycelium concentrates, as it were, in small masses underneath the skin, and in these are produced the spores. These masses soon break through the skin, and the black pustules with the spores appear. The spores are scattered and they reinfect other fruit and vines. Although it is possible for a new generation of spores to be borne within two weeks, it requires favorable weather conditions for the disease to develop.

While early sprayings, in some cases, have not been found to give the results expected, the life history of the disease shows that it is wise to endeavor to destroy as many spores as possible at or before the first infection. The first spraying should be made just after the fruit has set. the third and fourth at intervals of about a week--all with ordinary Bordeaux mixture. There should then be three sprayings with ammoniacal copper carbonate or soda Bordeaux. Although the disease will probably not be eradicated from a vineyard in one season, the more thoroughly the spraying is done the less trouble there should be. It is now 16 years since it was conclusively shown that Bordeaux mixture would control this.

W. H. Bunting: Some years ago I found symptoms of this disease among the Rogers varieties, and sprayed them spasmodically, but without much effect, as the spraying was either too late, or not frequent enough, frequent spraying being necessary. In 1901, I discovered some symptoms of rot in my Niagara vineyard, but at first I was not much alarmed. The following week, however, on again visiting the vineyard, on my return from the Pan-American at Buffalo, I found that the disease had spread with great rapidity. I became alarmed, and at once arranged for some spraying; but we were too late in starting operations, and probably a third of the crop was destroyed. In 1902 we did not have as much, but in 1903, almost in a night, as it were, the disease attacked the Niagara vineyard. I then came to the conclusion that something must be done or I should have to go out of business. I made enquiries throughout the district and found that here and there, more particularly along the lake shore on sandy land, the disease had obtained a very serious foothold. I found that some people had been treating it to some extent, but with little result. I then corresponded with Prof. Selby, of Ohio, received the bulletins issued in connection with his work, and endeavored to inform myself as well as I could, and resolved on a serious campaign. The past season has been very favorable to the spread of the disease, owing to the frequent rains. I sprayed one vineyard seven times, and am glad to say I feel that I have been more than repaid for my efforts. I did not eliminate the disease, by any means, owing, I think, to the climatic conditions being so favorable to its spread, and from the fact that the disease had obtained a very serious hold; but the results have been so encouraging that I have every hope of eradicating it next season. One block of 500 Niagaras, which were the most seriously diseased in 1903, pro-

duced for me this year one of the old time crops, and the percentage of loss in the vineyard I sprayed seven times, was very slight. I can say with every degree of confidence that, if you take up the methods of treatment advocated, and pursue it energetically, you will be quite successful in overcoming the disease or in preventing its appearance. I am certain that in a case of this kind, prevention is far better than cure. I have never engaged in any work of this kind in which the results were so marked and unmistakable.

W. M. Orr, Fruitland: What is the effect of the disease on the fruit from the time you first see it till the end?

Mr. Bunting: The first thing I noticed was small red blotches on the leaves. If this is present throughout the vineyard, even to a limited extent, you may be sure that the vineyard is attacked. Those spores work while you sleep, and do not show up in a very noticeable way until the effects are produced. The spot is a rusty red, as though molten lead had been dropped on the leaf, which had just scorched the tissue without burning through.

A Member: I think that the first indication is a black spot.

Mr. Bunting: It is quite possible; but the first symptom I observed was the red. As soon as it affects the crop, you will notice a soft spot on the side of the grape, which in several days will spread all over the grape. The diseased spot is lighter in color in the centre, and widens in a circle. As it spreads, the grape becomes soft and rotten. After that, it dries up. After the drying is completed, the black pustules form. These pustules also form on the red blotches on the leaves. They burst later on and give off spores.

Q. Have you any brown rot?

A. Not that I have noticed. I have had some forms of mildew.

Q. Do you practise clean cultivation?

Mr. Bunting: I have done so for many years. I plow late in the fall and work early in the spring, but during the last few years, when we have adopted cover crops to prevent winter killing, and have done away with late plowing on that account, we have sometimes allowed our vineyards to go a little later in the spring. This year I am taking two different vineyards and plowing one late and allowing the other to remain in cover crop, and we shall be able to determine which is the better method of treatment to prevent rot. I think, however, that spraying is the only treatment worth considering so far as this disease is concerned.

Q. Are any other vineyards in your neighborhood affected?

A. Yes, a great many.

Q. Have any escaped.

A. Yes, but it is probably only a matter of time until they will be affected unless preventive measures are taken.

Prof. Lochhead: Yes, in every case in the Ohio district; but clean cultivation is general there. They find in Ohio that the rot is always more severe on sandy soil, and because of that you will now seldom find a vineyard on sandy soil; they find it better to plant such land to other crops.

Q. Is there any noticeable difference between high and low land and between drained and undrained land?

A. Undrained and low land is most seriously affected. On high land probably half the crop would be injured, whereas on low land the whole thing would go, but where the vineyards are treated, there is no appreciable difference. Of course where you grow a cover crop, you cannot follow

clean cultivation, but that will not prevent the dead grapes and leaves being removed, which is the main source of infestation.

Q. Has damp weather any effect?

A. It is very favorable to the development of the spores, and the disease is always worst in a damp season

A. W. PEART, Burlington: I have grapes on both clay and gravelly loam. On the clay about five per cent were rotten, and on the other soil about fifty per cent were affected.

Q. Were they treated.

A. No.

Q. At what stage do the grapes commence to drop?

Mr. BUNTING: They drop all through the season. Most of the balance will drop off at the time of pulling, although not all.

Q. I notice that some formulas give six pounds of copper sulphate in the Bordeaux mixture?

Prof. LOCHHEAD: In some of the southern States they mix it in the proportion of 6-4-40, but I see no necessity for it.

Q. Would it not be an improvement to use more than four pounds for such a persistent disease as black rot?

Alex. MCNEILL: Mr. J. C. Harris, one of our most successful sprayers, insists that we use too little bluestone, and advocates 6 pounds to forty gallons.

Q. Don't you think that bluestone without lime would give better results in spraying grapes?

Prof. POWELL: I know a good many in the States who are using pure copper sulphate, even in the spring season, after the leaves have started fungous diseases. I have used it on cherries at the rate of five pounds to fifty gallons without any injury to foliage. In Michigan they use it for apple scab in the same proportion.

F. G. STEWART: I use six pounds of blue stone in forty gallons of water, using no lime. I sprayed certain rows of grapes once with this solution and they were entirely free from rot. I sprayed before there was any growth at all. The unsprayed portion of the vineyard was affected.

Q. If we could do the work with one pound of blue stone without the lime, instead of using four pounds of bluestone and four of lime, it would be a considerable saving.

Prof. LOCHHEAD: I do not think it would stick without the lime.

Q. What is the chemical effect of the lime in the mixture?

Prof. HARCOURT: The action of the copper as a fungicide is not destroyed by the lime, except that it is rendered insoluble, and it is brought into a solution again gradually by the action of atmospheric moisture. Its action is simply retarded.

Q. If you put in six pounds of lime instead of four, it would be retarded still further, would it not?

Prof. HARCOURT: Not necessarily; there would only be so much lime combined with the copper. The larger amount of lime would not mean that the copper was put in a more insoluble form, but only that a larger amount of lime was sprayed with the copper.

Q. Is it copper or the sulphur that is the active element in the fungicide?

Prof. HARCOURT: I understand that the copper is the active element, although sulphur is also a fungicide.

Mr. ARMSTRONG: I think that if we all adopt the plan of using lime and sulphur, giving a thorough application during the dormant season, it

would effect our purpose. I think that during the dormant season the copper sulphate is better without the lime, and six pounds, or even eight pounds is not too much, used in this way. In that case, you can do away, I am satisfied, with a good many future sprayings. I am satisfied that one good application is all that is necessary.

Q. Have you ever tried it?

Mr. Armstrong: I have tried it on peaches; not on grapes.

LATEST RESULTS FROM SPRAYING FOR SAN JOSE SCALE.

By Prof. R. Harcourt, Ontario Agricultural College, Guelph.

During the season of 1897 the San Jose scale was first discovered in the orchards of Ontario. Since that time the scale has caused serious damage and loss, especially to the owners of peach orchards; but, thanks to the energetic manner in which the matter was taken in hand by the Department of Agriculture, we are now able to say that methods for the controlling of this pest have been devised and are in operation and that the majority of the fruit growers recognize that the scale may be controlled and the vigor of an orchard maintained independent of its surroundings. It may not be possible to entirely eradicate the scale, and, like the potato bug, it may always be with us; but, just as the proper use of arsenical poisons may be used to control the latter, so the lime-sulphur may be used for the former and with equally good results.

One pleasing feature in connection with the application of the lime-sulphur wash is that it has greatly benefited the trees in other ways. To ascertain whether it is possible to still further cheapen and simplify the preventives for the scale the following experiments were undertaken:

In reporting the latest results from spraying for San Jose scale, I wish first to draw your attention to the trial of the relative efficiency of the lime sulphur wash and the McBain Mixture. This test was made in the orchard of Mr. Bunting, St. Catharines, and under the auspices of a special committee appointed by the Fruit Growers' Association. The orchard selected, consists of 65 thrifty growing but badly infested peach trees. Before the spraying was done each tree was carefully examined by Messrs. Bunting, Thompson and Healey, the members of the committee, and by Prof. Lochhead, and full notes were made regarding the condition of the scale on each tree.

Every other row was then sprayed with the lime-sulphur wash, and the intervening rows with the McBain Mixture. The application of the former was attended to by Mr. Bunting and of the latter by Mr. McBain. Both men were allowed to make the spraying as thorough as they saw fit, but nothing further was to be put on the trees until after they were examined by the committee. The lime-sulphur wash was the same as was being sold in the neighborhood at 90 cents per barrel, and the McBain mixture cost $2.50 a barrel.

The trees were carefully examined by the committee about the middle of July and again about a month later, and later still by Prof. Lochhead: and the general opinion was that there was practically no difference in the efficiency of the two remedies. The cost of the McBain mixture, however, practically put its use out of the question, unless it was for a few trees where the lime-sulphur wash could not be procured.

Other Washes Tested.

The same day a barrel of the lime-sulphur and sal soda and a barrel of the lime-sulphur and caustic soda washes were prepared and applied on the trees of an adjoining orchard which were also badly infested with the scale. The former wash is one recommended by Dr. E. P. Felt, State Entomologist, New York. His formula and directions for preparing the mixture are as follows: Lime, 25 pounds; sulphur (flowers), 20 pounds; sal soda, 12½ pounds; water, 1 barrel. "Put 5 or 6 gallons of hot water in a wooden barrel, add the lime, quickly following with the sulphur and sal soda, and stir until the slaking is practically completed. It may be necessary to add a little cold water at intervals to keep the mixture from boiling over. After the violent action has ceased, cover the barrel to retain the heat and allow it to stand 15 to 30 minutes, dilute to the full quantity and apply." In our preparation of this wash we first stirred the sulphur into the hot water and then added the lime and sal soda.

The lime-sulphur caustic soda was originated with the Geneva Experiment Station, New York State. The formula and directions for preparing the wash are as follows: Lime, 30 pounds; sulphur (flowers) 15 pounds; caustic soda, 4 to 6 pounds; water, 1 barrel. "In preparing the wash, the lime was started to slake with six gallons of water, and while slaking, the sulphur, which had just previously been made into a thin paste with hot water, was adding and thoroughly mixed in with the slaking lime. To prolong the boiling of the wash, the caustic soda was then added with water as needed, and the whole mixture was kept thoroughly stirred. As soon as the chemical action had ceased the required amount of water was added, when the mixture was ready to use. Aside from the heating of the water, the cooking of the wash was done in a tub or barrel, and took from ten to twenty minutes. In some preparations, especially when hot water was used to start the slaking of the lime, not all of the stated amount of caustic soda was employed, but six pounds was the maximum."

In preparing this mixture, we followed the same plan as mentioned with the former wash. The sulphur was first stirred into hot water and then the lime added. When the boiling ceased all the caustic soda was put in at once. The whole was thoroughly stirred to prevent caking on the bottom of the barrel. The caustic soda should be used in the graulated or powdered form to insure the best results.

Where the Tests were Made.

Both the washes developed the characteristic color of the well boiled lime-sulphur combinations, and those present were delighted with the simplicity of the method of preparation. These washes were made and applied in the orchards belonging to the following gentlemen. Careful notes were made on the condition of the trees before the wash was applied. The orchards and tests were: Mr. Geo. Robertson, one barrel of lime-sulphur and sal soda, only two trees badly infested; Mr. W. C. McCalla, one barrel of lime-sulphur and sal soda, trees badly infested; Mr. Griffith, one barrel lime-sulphur and sal soda, one tree particularly badly infested; Mr. W. H. Secord, one barrel of each wash, trees all infested, worst ones marked; Mr. Titterington, one barrel of each, trees badly infested; Mr. McArdle, one barrel of each, trees badly infested.

These orchards were visited in July and August by Prof. Lochhead, J. Fred. Smith, Robt. Thompson, P. W. Hodgetts and myself, and in every case little or no difference could be seen in the amount of living scale be-

tween the trees sprayed with these mixtures and those on which the boiled lime-sulphur washes had been used. Some of the members of the committee were inclined to think that the mixture containing the sal soda gave rather better results but there was very little difference.

Of this season's work Dr. Felt reports to the effect that excellent results were obtained from the use of the lime-sulphur and sal soda mixture. The Geneva Experiment Station workers state that the results obtained from the wash were good, but not uniform. At the New Jersey Experiment Station, Prof. Smith reports that this wash has been quite effective, but that it is not so good as the boiled mixture and costs a little more. The indications from this year's experiments are, that if properly made, a useful material is obtained.

The ease with which these mixtures may be prepared will greatly recommend them to the small fruit grower who has not sufficient trees to warrant the installing of a steam boiling plant. It cannot, however, be too strongly emphasized that the greatest care must be exercised in the preparation of these washes. Only freshly burned lime of a quick slaking variety should be used and it must be handled in such a way as to recover the maximum of heat from the slaking. In order to accomplish this, hot water should be used to slake the lime. In preparing the lime-sulphur caustic soda wash, the caustic soda must be added in the powdered form, as in this condition it dissolves more quickly and causes more violent boiling than when in the big lumps.

Regarding the cost of these washes, as compared with that of the boiled mixture, it is impossible to give exact figures, for the cost of the boiling will depend on the efficiency of the steam plant used. As about the same amount of lime and sulphur are used in all cases, it practically leaves the cost of the boiling to be compared with the cost of the sal soda or caustic soda used, and the required quantity of these to make a barrel of the mixture can be obtained for 25 cents.

There is no doubt any of these mixtures will destroy the scale, but every part of the tree must be covered with the wash. Any part left uncovered, acts as a seed bed for the reinfestment of the whole tree. As it is practically impossible to cover every crotch and crevice on the tree, the use of the lime-sulphur washes may not exterminate the scale, but there is no doubt that when they are properly applied the pest can be controlled.

Q. What is the difference in cost in preparing the solution with caustic soda as compared with boiling? If the cost of the caustic soda method is no greater, it seems probable that the boiling process will be discarded by the smaller grower ?

Prof. Harcourt: I do not wish to say that it can be prepared cheaper with caustic soda than by boiling; that will depend on the conditions under which you are boiling. One grower told me that he prepared his mixture by boiling at a cost of very little over fifty cents a barrel including everything. Others say that it costs them a great deal more, depending, I assume, on the efficiency of their plant for developing the steam required in the boiling process. The sodium carbonate and caustic soda will cost in the neighborhood of twenty-five cents a barrel, as against the cost of boiling by the other method.

Q. Is the active agent in killing the scale found in the liquid or in the insoluable substance at the bottom of the test tubes ?

Prof. Harcourt: I cannot answer the question definitely, as I am not aware whether it is the lower or the higher sulphides that kill the scale, but we assume that it is the sulphides in solution which do the work.

Q. If the flowers of sulphur is first reduced to a liquid and then added to the water and lime, do you think that the efficiency of the mixture would be lessened ?

PROF. HARCOURT: I do not see why it should be.

A MEMBER: I have been making my mixture in that way, and have reduced the cost to 25c. per barrel. We dissolve the sulphur in hot water We make a stock solution and keep a quantity on hand.

ROBT. THOMPSON, St. Catharines: I think there is no question that for the large grower the old method of preparing the mixture by boiling with steam is preferable to the caustic soda method, but for the small grower the latter method may have some advantages.

PROF. HARCOURT: In making the lime-sulphur-sodium carbonate and lime-sulphur-caustic soda mixture, great care should be taken to procure the right kind of lime. It must be a freshly-burned, quick-slaking lime. Select the large pieces. Add a little water to start with to get the slaking started, and then increase the amount gradually so as not to drown the lime, or you will stop the reaction and prevent boiling. I think that the lack of uniformity of results by this process is due to the fact that a uniform quality of lime has not been used. Until the new process has been further experimented with, I think it would be wise to stick to the boiling process. The chief thing to be said in favor of the new method is that it is very convenient for growers with a small number of trees.

INSPECTOR J. F. SMITH, Glanford: We had hoped that the severity of last winter would have had a destructive effect upon the San Jose scale, but the appearance of infested trees this autumn proves that it had no material effect. There was much more scale killed on peaches and plums than on apples, owing, I think, to the protection offered by the woolly bark of apple trees. Another reason for this is found in the fact that in a severe winter the vitality of peach and plum trees is at a very low ebb, and on that account they provide very little nourishment for the scale, and it is probable that the scale is starved as well as frozen.

It was noticeable that the scale did not winter as well in the Niagara district as in some other exposed sections of the Province, and I am unable to explain the reason for this; but it may have been caused by different conditions in the early winter. The fact that it survived such a severe winter, goes to show that none of us who have scale in our orchards can afford to wait till the winter kills it.

The department continued to supply spraying materials to growers at a reduction on cost, purchasing 84,464 pounds of sulphur, 8,514 gallons of crude oil, and 40 barrels of the McBain mixture. The strength of the latter mixture was increased this year, and the results obtained from its use were very good. It is rather an expensive mixture for large growers to use. Crude oil is still the favorite remedy in the Niagara-on-the-Lake section. It will kill the scale, but it is not safe to use on all fruit trees, and it is getting more expensive every year. I am still of the opinion that lime and sulphur is the best remedy for the scale, and it will pay to use it where no scale exists, as it is a good fungicide. Spray your trees with lime and sulphur and you will never have the scale. It will prove to be the "ounce of prevention." If you wait till your orchard is thoroughly infested, you have an uphill task.

Q. How does the mixture work on the Oyster Shell Bark Louse?

MR. THOMPSON: They use it for that purpose in the West, and claim that it gives good results.

Q. What effect has the solution on leaf curl?

J. F. Smith: It has been very beneficial, and it is claimed to be just as good a remedy as Bordeaux mixture.

Q. Do trees that are sprayed with lime and sulphur stand the winter better?

Mr. Smith: Yes; I observed that in some cases trees sprayed with lime and sulphur came through the winter all right, whereas trees in the same orchard that were not sprayed were winter-killed.

CO-OPERATIVE WORK IN 1904.

By A. E. Sherrington, Walkerton.

Our Association was organized two years ago last spring. A year ago each member was allowed to pack his own fruit, and was required to place his name on the package, in which way he became responsible for his own packing. This system did not work satisfactorily, and I believe it is not a good one.

This season, we established a central co-operative packing house, controlled by a joint stock company. We bought a building near the station. There is a cellar under the building which we found cool enough for the purpose even during the heat of summer. To this central packing house our people brought their apples in barrels, the barrels having been purchased wholesale through our Association. Where growers were not able to deliver the fruit in spring wagons, we recommended them to use hay racks, placing hay in the bottom, and we found that apples could be delivered in this way at the packing houses just as well as in spring wagons. Any apples that were delivered soft and unfit for packing were returned. Two or three lots were returned for that reason. As the apples were brought in, boys and girls were set to work to cull them. They were graded No. 1 and No. 2, and each man was credited with the amount supplied by him in each class. In selling, we tried to keep each man's apples separate, but put all the No. 1 together and all the No. 2, and divided the proceeds among our co-operators, according to quantity of each class they had supplied. We found it was less expense to pack in the central packing station than it was in the orchard. This year we were able to pack our apples for 10 to 15 cents per barrel. In other years it has cost us 25 to 30 cents. This year we have also obtained better prices, and, in addition, have been able to sell thousands of barrels of apples that would have been wasted in other years through the buyers refusing to buy them when they were ready for market.

During last winter I attended some twenty-five institute meetings, and delivered some forty addresses on this subject. As a result, six organizations were formed. I have had a great deal of correpondence from all parts of Ontario with reference to the movement, so large indeed that, on account of ill health, I was unable to reply to all the letters received.

Until we have central packing stations, we shall never have uniform packing. In this connection I might state that we need some means by which instruction can be given in packing. I heard what the Hon. John Dryden, Minister of Agriculture said, in regard to securing a man to give instruction in packing, and I heartily approve of the idea. If classes could be held at the Agricultural College, uniform methods of packing could be taught, which would be of great benefit. Every man has his own idea of what No. 1 fruit is, and so long as every person packs his own fruit, there can be no uniformity.

In addition to uniform methods of packing, we need co-operation with the consumer. It has been said that commission men may object to our entering the field and filling the orders of customers direct. What do we owe commission men that we should heed their objections? The fact is, they owe us far more than we owe them. We should have some method by which we might know how much fruit is received in the principal consuming centres, what it costs to handle that fruit and what the fruit realizes. This is also true of shipments to Great Britain. Why should we send our fruit to strangers and allow them to do practically what they like with it?

In these co-operative associations which are being formed, we must not look for large returns at first. In some cases it may be one or two years before they can be placed on a satisfactory basis. If we continue, however, we shall perfect our methods and finally become established on a firm footing. The great weakness of the various associations I have established has lain in the fact that there is no means by which they can be united. They are separate, and lack cohesion. If we could arrange a method whereby these Associations could become identified with the Fruit Growers' Association, it would soon greatly increase the membership of the Association, and be a benefit to all concerned.

Growers should remember, however, that co-operation will not advance the price of poor fruit. Even an Association is unable to obtain good prices for anything except No. 1 fruit. Co-operation really begins in the orchard in the growing of the fruit.

Q. I should like more information as to the formation of these local organizations. What tie binds the individual growers together so far as central packing houses are concerned?

Mr. Sherrington: When I go into a district to discuss the question, I simply point out the advantages of co-operation and leave the matter with them. The rules and regulations governing local associations are practically the same as for Farmers' Institutes, and the fee is 25 cents per year. They are supposed to hold monthly meetings. I should like to see them affiliated with this Association, so that their efforts might be directed. They should not be left entirely to their own resources. After a local association has been decided upon, I then introduce the question of co-operative work. If they decide upon this, they purchase or lease a suitable building and engage a manager, and form their own rules and regulations. The duties of the manager are to supervise the packing, make the sales and attend to the shipments.

Q. What would be a fair wage?

Mr. Sherrington: That would depend on the extent of the business. One man I know of is paid five cents per barrel. The year before last, when I undertook the work at our packing house, I received two cents per barrel, and considered I was overpaid.

Q. Have you had any experience with tender fruits? How could peaches be handled in this way?

Mr. Sherrington: Just as well as apples. This system has been very successful in the peach districts of Ohio, and in California they employ no other.

Q. How do you keep the cellar cool?

A. It is underground, and we open the windows at night.

W. T. Macoun, Ottawa: What do you do when growers bring in soft fruit?

Mr. Sherrington: If it is not up to the standard, we refuse to handle it. Our building is 30x100, and has a cellar in which the hardy winter stock

is kept until we are ready to handle it. Most of our winter apples are still in the cellar. In this way it is not necessary for us to leave our fruit in the orchards in all kinds of weather, where most of it would be ruined. Most of the fruit which is now in the cellar of our building would have been lost ,had we not had this place in which to store it. As it is, the apples of our section are now safely stored ready to be marketed when the time comes. This year we marketed large quantities of such varieties as the Duchess and Astrachan, which in other years were wasted.

Mr. Haynes, St. Catharines: Do I understand that each fruit grower loses his identity when he turns his fruit over to your company, or do you allow the growers' names to appear on their boxes, while stating that the apples have been graded by your company? There is considerable difference in the quality of No. 1 fruit. This difference is so great that it makes it possible to have various grades of No. 1 fruit. Growers who produce the best grades of this fruit should, in my opinion, receive proper credit for it.

Mr. Sherrington: Our growers are not allowed to place their names on the boxes. If there was a sufficient quantity of these exceptionally fine apples there would be no difficulty in making up a separate car load of them. Where our apples do not grade as strictly No. 1, they are graded as No. 2.

Robt. Thompson, St. Catharines: There is sometimes a difference of 25 cents per barrel between No. 1 apples, and I think that the man who cultivates and handles his orchard so as to produce something superior to his neighbors, should get the advantage of it. It seems to me that the name of the grower should be placed on the barrel as well as the grade.

Mr. Sherrington: We have no objection to the name appearing.

Mr. Alex. McNeill: This is a matter for local regulation, but there is a broad principle involved. One of the great difficulties in the way of co-operative movement is the lack of public sentiment and the willingness to sink individuality for the common good. We shall never succeed with these co-operative associations until each grower is willing to sink his own interests for the benefit of the common cause.

Mr. Sherrington: In my case I did not need to join a co-operative association. I was growing enough apples to enable me to ship for myself, but my neighbors were not in such a position. By co-operating we have practically shut the buyers out of the district. Before we co-operated, buyers used to visit our section and purchase a few crops at low prices. By threatening not to buy the crops of other growers they were able to secure them at ridiculously low figures, and in this way the average price was kept down to the disadvantage of all the growers. Since the Association has been formed, the buyers have not been able to do this, and we have all shared in the benefit. Growers must work together if they are to succeed. One of the great advantages of co-operative work is the benefit it brings to the small grower who is otherwise at the mercy of the dealer. I am willing to put my crop in along with his, and to sink my individuality and self interest to help him out. I do not lose anything by it, and it benefits the community.

Q. What area does your packing system cover?

Mr. Sherrington: Ten miles is about the limit. It is better to have more associations than to attempt to cover too wide an extent of territory. Then there might be a larger central storage building in the district from which shipments could be made. I am strongly in favor of f.o.b. sales, and I find that the commission merchants are in favor of this system, if they can be guaranteed as to the pack. I think it would be a good idea for the Department to issue a bulletin covering all the details of the movement—co-op-

erative packing, selling, buying, spraying, etc.,—as at the present time the small growers have a very hazy idea of the movement.

D. Johnson, President Forest Fruit Growers and Forwarding Association: Our Association was formed only last spring. Its organization was the result of two interesting meetings held in our section by Mr. Sherrington. My father and I had been shipping apples to Great Britain for years, and had won a name for our fruit. We thought at first that co-operation might be desirable for small growers, but that it was not necessary for large growers like ourselves. At my request, Mr. Sherrington visited our neighborhood and held two meetings. After hearing him, twelve of us finally agreed to ship together, and we sent a salesman to the North-West to introduce our fruit. We thought there were a number of other growers in the section who would like to join us and we invited them to do so, but insisted that they must submit to our rules, as we had too much at stake to care to risk loss through any selfish action on the part of a few growers.

At first we tried shipping from the orchards, but soon found that this would not do. The growers all had their own ideas as to how their fruit should be packed; so we decided to establish two central packing places, one on my own farm and one at Forest, which was done. Many growers were afraid that their fruit would be bruised by being handled in this way, and refused to send their apples to these packing houses. A number, however, sent their fruit, and it was not long before more fruit was received than we could attend to. We followed Mr. Sherrington's plan of placing hay in the bottom of the wagons, and found it worked very satisfactorily.

Q. What did you realize for your fruit?

Mr. Johnson: At first we were offered $2.75 per barrel for No. 1, f.o.b. This price, however, was soon forced down through competition. The average price realized during the season was $1.90, f.o.b., for No. 1 fruit, and $1.55 for No. 2. We have shipped a large quantity, and have not received a single complaint from the buyers.

Q. What did other growers in your district who did not belong to your Association obtain for their fruit?

Mr. Johnson: Very few growers were able to sell their fruit at any price, but those who did sell realized 50 to 60 cents per barrel for their firsts and nothing for their seconds. Some only obtained 10 to 12 cents per bag for No. 1 apples.

Q. What did you do with your waste fruit?

Mr. Johnson: It was sold to two evaporator firms and we obtained 15 cents a bag for peelers and 5 cents for chops. One of these evaporators is located at my place and handles 100 bushels per day; the second one is at Forest and is managed by a company which handles 500 or 600 bushels a day."

Q. How much fruit did you handle?

Mr. Johnson: About 38 or 40 carloads. We also co-operated in securing our barrels. We bought our own material and employed a cooper. The barrels were of excellent quality and cost us only 28 cents each. At the last of the season, when our supply was exhausted, we tried to buy some barrels from coopers, and although we enquired everywhere we were unable to obtain any for less than 45 cents per barrel and they were not nearly so good as those we had made ourselves. Some one, this afternoon asked how a man could be expected to sink his own identity when he joins an association of this kind. The members of our association sunk their identity and have never regretted it. Occasionally some of the growers place their initials on their barrels, but the initials never appear in the invoices or bills. We are well pleased with this year's work and look forward with confidence to next sea-

son. One of the benefits that has resulted from handling our fruit in this way has been that the steamship and railway lines have been anxious for our business and have made material concessions to obtain it. Mr. Sherrington's suggestion that the growers should have a central organization is a good one. I have thought that if a central station could be established, say at Toronto, so that the various local associations could all ship their fruit to it or arrange to have their fruit handled in bulk, it would be a much better method than anything we have at present.

Q. Did you pack in cases?

Mr. Johnson: No. We were young in the business and did not care to undertake too much the first year. I am sorry now that we did not ship some of our fruit in that way.

Q. What was done with your culls?

A. We sent them to the evaporator and the returns were used to defray general expenses.

Q. That seems hard on the man who had a lot of culls?

Mr. Johnson: Yes, but we told such men that it cost more to handle their fruit.

Elmer Lick, Oshawa: There are a great many difficulties before fruit growers when they try to co-operate. In our district the buyers combined and coaxed the growers to forsake the co-operative association, and we found it difficult to carry out our plans. There were many buyers this year and they offered the farmers good prices.

Q. How much was offered?

Mr. Lick: As high as $1 per barrel in some cases, but in the end the growers were unable to obtain this amount when the buyers settled. A few of us combined and shipped our fruit together, and I believe we are going to obtain better prices than the growers who sold privately. Now that we are forming so many co-operative associations throughout the country, it has struck me that we need a central head to combine and watch the interests of all. Such a body might be called The Ontario Fruit Growers' Union, and the various subdivisions might be called the Forest Branch, the Whitby Branch, etc.

Mr. Sherrington: It has been intimated that the reason the fruit growers in the Forest and Walkerton districts have been able to co-operate was because the buyers did not oppose the movement. That was not the case in our district. The buyers tried the same game with us that they did with Mr. Lick. Some of our growers were coaxed off, but they were afterwards sorry and were glad to come back. It was the same at Forest.

Mr. Robert Thompson, St. Catharines: The fruit growers of the St. Catharines district became incorporated several years ago and lately we have been devoting our efforts largely to improving the freight service. Last year, in spite of the heavy crop of plums, we obtained fairly satisfactory prices, and we now find that our members expect higher prices for their crops than they used to before we co-operated. Last spring we held a number of meetings along the line of the railways to urge greater co-operation, but as this year's crop has been rather small and the prices good, we did not push the matter as we would otherwise have done. We do quite a little in the line of co-operative spraying. In the township of Louth the fruit growers bought an outfit and did good work. In our township some of the threshers took charge of the work and the growers agreed to pay their share of the expense. The results of this spraying have encouraged the growers to grow more fruit. The response of the trees to this treatment has been very encouraging as the spraying not only prevents but acts as a remedy for the scale

and has an equally beneficial effect on the curl leaf and other kindred diseases. The results have greatly encouraged the growers.

We have also co-operated in the purchasing of paris green, blue stone, boxes, etc., and, thereby, have made a nice saving. When purchased in large quantities we find that the quality of spraying material secured is much better than where growers buy individually in small quantities.

In regard to the trial shipment of fruit to Winnipeg, I may say that the fruit growers in the vicinity of St. Catharines are sufficiently well satisfied with the results that they are willing to continue such shipments provided proper oversight is given and the interests of growers are safeguarded at the other end.

A. W. PEART, Burlington: We have had a small co-operative association for the last ten or fifteen years. We co-operate in the buying of boxes and in shipping to the old country market, and find we save money by so doing. We have rules to govern the packing of our fruit, but the individuality of the grower is maintained, and the consignee is instructed to make full reports for each individual. Each member places his name and address on the package, and we have a common number to designate our association, instead of a name.

We ship in a box holding half a bushel—9x12x18 inside measurement—taining more for our fruit in that way. Being near Hamilton, we find labor hard to obtain, and many have to use family labor. In sorting and grading apples we find that women do as much or more work in a day than men, on an average, and we get them at half the cost. A bushel box is too heavy for a woman to lift.

Q. Is your Association incorporated?

MR. PEART: No; it is not necessary. It is co-operative in spirit, a few neighbors combining together. There is nothing binding except honesty among the members.

Q. Do you think it possible to put the name of the grower on the package where you have a central packing house?

MR. PEART: I think in that case we would try to preserve the individuality of the shipper.

MR. HAYNES: That is I think done in the case of California shipments.

Q. If you found a man was shipping poor fruit, is there any way in which you could prevent his using your brand?

MR. PEART: We are very careful when taking in members. We will not allow a man to join our association unless we know he ships good fruit. The price each grower receives is the best safeguard we have that he will ship good fruit. We find it is a good one.

When the market in the Old Country is not satisfactory, we sometimes arrange to have our fruit stored. On some occasions fruit has been stored for some months. Our system works out well for late pears suitable for export. We have shipped without cold storage and have found that the pears arrived in good condition.

Q. Do you send a man to Great Britain to watch your interests?

MR. PEART: No, we simply consign our fruit to commission men.

Q. Could not growers place a man in Great Britain to watch their interests?

MR. PEART: Such an arrangement would be very difficult. The British firms, handling Canadian fruit, have been in the business for a great many years and are firmly established. Most of them have numerous connections in other cities and know how much credit they can give their agents and how

long it is safe to let their credit run. Were growers to try to compete against these firms we would find it almost impossible to meet their opposition. Such a man, however,, might be of great value in watching the prices at which fruit was sold, etc.

Q. The English houses purchase largely f. o. b. in Nova Scotia?

Mr. Peart: I think that system is likely to become more of a factor here.

H. W. Dawson, Toronto: I have studied the central packing house idea, and I am convinced that it will do more for the grower than any other system. The fact that the fruit is taken to the packing house as soon as it is picked, and not left on the ground in the orchard, and is uniformly graded and packed, will insure the grower better returns than by any other method. One or two nights on the ground will mature the fruit more than a month under cover. If a packing house will establish a brand and keep the grade up to that brand, it will be only a matter of time before buyers will be hunting these apples instead of your hunting a market for them. In California every packing house has its own brand. When a dealer wants a car of oranges, he goes to the house whose brand has the best reputation. As to the package, the box is certainly the package of the future for high grade apples. For low grade apples, it makes no difference whether they are in boxes or barrels.

CO-OPERATIVE COMMITTEE.

The following committee was appointed to forward the work of promoting co-operative organizations during the year: A. E. Sherrington, Walkerton; Robt. Thompson, St Catharines; D. Johnston, Forest; E. Lick, Oshawa; A. W. Peart, Burlington; W. D. A. Ross, Chatham.

Your Committee on Resolutions begs to report as follows:

"That the thanks of the Association be tendered the sister society of Quebec for sending a representative in the person of Mr. Chapais, to assist in our deliberations."

"That the thanks of this convention be tendered to Mr. G. H. Powell of the United States Department of Agriculture for his attendance at our services and his valuable address on cold storage."

"That the members of the Ontario Fruit Growers' Association have heard with sorrow of the affliction which has visited one of our oldest and most respected members, Mr. T. H. Race, in the death of his wife and wish to express their most sincere sympathy with him in the great loss sustained."

"That this convention, representing the fruit growers interests, of Ontario, desires to express its appreciation of the services rendered by the Dominion Department of Agriculture in inaugurating a system of crop reporting in regard to fruit and hopes the service will be continued and be extended."

"That this convention urges upon the Minister of Agriculture for Canada the advisability of securing such legislation as will give the inspectors under the Fruits Mark Act, or other suitable officers, absolute control over the loading of apples on shipboard from Canadian ports."

"That this convention desires to respectfully but most strongly urge the Parliament of Canada to so amend the Railway Act as to place express rates under the control of the Railway Commission as freight rates are now."

"That whereas there is reason to believe that in many cases the returns made to fruit growers by commission dealers do not represent the full

amount of the prices realized by such dealers, therefore be it resolved that the Minister of Agriculture for Canada be urged to take such steps as may be necessary to place commission dealers under Dominion regulations with a view of wholly preventing or largely reducing such fraudulent practises."

IMPORTANCE OF CROP REPORTS.

Mr. Caston in presenting the resolutions said: "I think the one dealing with the preparation of fruit crop reports a very important one. We all know that certain parties are always at work trying to depress the market. Probably their work has little influence with the larger growers, with whom fruit is a specialty, but it does adversely affect the interests of growers who are farmers first and fruit growers in a small way only. The Department of Agriculture can render no better service than by furnishing us with reliable statistics, at the proper time, as to fruit crop prospects.

"The resolution asking that officers of the Government have control of the loading of apples on shipboard is also a most important one. We have all heard of barrels reported 'slack' on arrival in England. This 'slackness' is often due to rough handling in loading. It should be provided, too, that no apples in barrels shall be piled more than five tiers deep."

The resolutions were unanimously adopted.

TO CONTINUE THE EXHIBITION.

The following resolution was adopted, expressing the opinion that the fruit, flower, and honey show shall be made a regular feature of the annual convention. "That in the opinion of the members of the Ontario Fruit Growers' Association, the educational value of the Fruit, Flower and Honey Show is of such importance to the horticultural interests of the Province, therefore be it resolved that the Minister of Agriculture for Ontario, be petitioned to continue the assistance which he has so generously provided this year, so that the Exhibition may be carried on from year to year." In speaking of this resolution, Mr. Caston said: "We have seen what the live stock men have done with their annual Winter Fair at Guelph. They have put up the best educational fair in America. I have long felt that we as fruit-growers are much behind the stockmen in this matter. I believe we can duplicate in fruit what they are doing in stock, by continuing and expanding this fruit exhibition idea. This exhibition can be made of great educational value to growers, and be made as well the means of increasing the demand for our fruits in the greatest consuming market of the Province."

FRUIT GROWING IN QUEBEC.

By J. C. Chapais, Delegate of the Pomological and Fruit Growing Society of the Province of Quebec.

I appreciate it as a very lucky occurrence for me the fact that I have been appointed a delegate from the Province of Quebec to your present Convention, first, because it gives me the opportunity of meeting the best authorities in fruit culture to be found in America, and, second, because it gives

me the pleasure of visiting the finest show of fruit, flowers and honey that has ever been organized in our Dominion.

Of course, I am here only to observe, listen and learn, not to teach. I have been sent as delegate by the members of our Quebec Pomological and Fruit Growing Society, to gather all the possible information to be got from such an important meeting as yours, and to report about what I will see and hear for the benefit of our own Association. You will, then, understand that I am not going to take your time in delivering a long speech.

In perusing the last valuable and very interesting report of your Society I have seen that you take some interest in hardy fruit from Northern districts, a subject that I have found exhaustively treated by Mr. Macoun of the Ottawa Central Experimental Farm on page 90 of said report. I have thought that, perhaps, you would be pleased to get a little information on the success we have obtained in the growing of fruit in a section of our Province which is probably one of the most northern of those where fruit trees are planted in Quebec. I mean to speak of the eastern district situated northeast below the city of Quebec, by about 47 degrees 30 minutes of latitude north. There we grow with very good results, as good a quality of fruit as in Montreal and east Ontario, of the following varieties:

Apples: Alexander, Bode, Duchess, Fameuse or Snow apple, Grand Mother, Hare-Pipka, Hyslop, Orel, Peach of Montreal, Red Astrachan, Red Queen, St. Lawrence, Summer Strawberry, Titovka, Transcendent, Wealthy, Whitney, Yellow Transparent.

Cherries: Early Richmond the same as the cherry called in our district French Cherry (Cerise de France) because it has been imported there by the first French settlers who came from France; and Montmorency ordinaire (Common Montmorency).

Pears: Flemish Beauty.

Plums: Blue Damson, Early Yellow, Reine Claude of Montmorency.

In small fruit we also grow with equal success:

Currants: Black Champion and Naples; Red, Fay's Prolific and La Versaillaise; White Grape and White Dutch.

Gooseberries: Columbus, Downing, Houghton and Pearl.

Raspberries: Cuthbert, Golden Queen and one yellow variety brought from France by old settlers and named White Raspberry (Framboise blanche).

Strawberries: Lovett, Sharpless, White Alpine and William Belt.

These are what we call our "Iron clad," because they stood the two severest winters we have had since over sixty years in our Province; those of 95-96 and 1903-04, the first one having been a root-killing and the last one a trunk-killing winter. The thermometer, during those winters, read as low as 34 and 35 degrees below zero, Fahrenheit.

Besides the varieties above named, we have many others which give us very fair results every year. I may say that, in my own orchard, I have 40 varieties of apples, 12 of cherries, 7 of pears, 29 of plums, 2 of black, 3 of red and 2 of white currants, 4 of American and 7 of European gooseberries, 1 of black, 2 of red and 2 of yellow raspberries, 2 of white and 4 of red strawberries. These are all cultivated at St. Denis, Kamouraska County, in our Province, by 47 degrees 30 minutes of latitude north.

Now, if we have good results with many varieties of fruit, as I have just pointed out, we have, I must say, to contend with almost as many insects.

enemies and diseases of trees as you have. As you know them all, I am not going to name them, except one bug, however, which is such a source of complaint in all parts of the Province, and comes under such peculiar circumstances that it is, I think, good to draw your attention to it. I have seen a queer, but very good description of that bug in one of your Ontario agricultural papers, published in this city, and it may interest you to have it recalled to your memory. This bug was identified some years ago by the celebrated Darwin. He was known as the best entomologist of his time, and as being able to identify, at first sight, any kind of bug. Some of his friends, one day, pretended to have a joke at his own expense. In consequence, they made, in a very artistic manner, a sham bug, in the following way: They took the body of a grass hopper, taking away from it the head, wings, legs and tail end. To that body they adapted the head of a May-bug, the wings of a butterfly, the legs of a milleped, the tail end of a cricket, and they put it in a little card-board box. Then they went to Darwin's house and asked him to identify that new, and to them, absolutely unknown bug. The scientist gave first, a sharp look to the bug in the box. Then he put on his spectacles and, taking the bug out of the box, he began to act as if making a close inspection of it, putting now and then, a question to his friends: Where did they find it? "In a field." Was it flying? "Just a little." Did it hum? "Yes, very much." "Well, no wonder," said he, "it is a hum-bug."

Now, the bug we find the hardest to fight in our Province is the humbug, not under the same shape as the one just described, but under that of tree peddlars who, every year, come in our localities to sell trees, which, after their own descriptions, are the very best of all the fruit trees to be found in the trade. Some of these peddlars are honest, but our people have made, at their own expense, the sad experience that many of them are nothing but humbugs who have sold for thousands of dollars trees under false representations. In this way, a very large quantity of fruit trees have been sold under various names, which, however, have proved to be nothing but very common crabs.

This evil is growing so much with us that our Pomological Society has passed, at its last summer meeting, a resolution which I will read to you:

"Resolved that the meeting of Fruit Growers, assembled at their Summer meeting at St. Jerome, after having heard many complaints from farmers who had suffered severely at the hands of certain fruit-tree vendors, who had sold them trees which were not suitable for the climate and other conditions of the Province of Quebec, believe that it would be to the interest of the nurserymen of this Province, as well as to that of the farmers, that all these vendors of fruit trees should be licensed, after an examination, showing that they possess the necessary knowledge of the fruit trees required and the conditions necessary for their cultivation in this Province; and this, for the reason that, at the present time, they, as is plainly seen, do not know the nature of the trees that they sell, as regards their hardiness, fruitfulness and their adaptibility for cultivation in the districts in which they are offered for sale."

We have thought necessary to take such a step because, as things are now standing amongst our farmers who have been humougged in the way above described, it is very dangerous for a tree peddlar to come around.

If I have spoken a little at length about the trouble arising for us from the doings of dishonest tree peddlars, it is in the hope that perhaps your Association would lend us a hand to secure the means of getting rid of that trouble.

List of Fruit Trees and Small Fruits Grown in the Orchard of Mr. J. C. Chapais, St. Denis, Kamouraska County, Que.

Apples.

1.	Alexander	Bearing
2.	Baxter	Not B.
3.	Ben Davis	Bearing
4.	Bode	"
5.	Canada Baldwin	"
6.	Canada Red	Not B.
7.	Duchess	Bearing
8.	Fameuse or Snow	"
9.	General Grant	"
10.	Golden Russet	"
11.	Grand-Mother	"
12.	Hare Pipka	"
13.	Hyslop	"
14.	Longfield	"
15.	McIntosh Red	"
16.	McMahon	Not B.
17.	Mann	Bearing
18.	Montreal Beauty	"
19.	North-West Greening	Not B.
20.	Ontario	"
21.	Orel No. 1	Bearing
22.	Peach of Montreal	"
23.	Pewaukee	Not B.
24.	Princess Louise	Bearing
25.	Red Astracan	"
26.	Red Beitigheimer	Not B.
27.	Red Queen	Bearing
28.	St. Lawrence	"
29.	Salome	"
30.	Scott's Winter	Not B.
31.	Summer Strawberry	Bearing
32.	Titovka	"
33.	Transcendant	"
34.	Wealthy	"
35.	Whitney	"
36.	Winter Arabka	"
37.	Winter St. Lawrence	"
38.	Winter Dessert	Not B.
39.	Wolfe River	Bearing
40.	Yellow Transparent	"

Cherries.

1.	Bessarabian	Bearing
2.	Common Cherry	"
	Imported from France.	
3.	Common Montmorency	"
4.	Dyehouse	"
5.	Early Richmond	"
6.	Empress Eugénie	"
7.	Fouché Morello	"
8.	French Cherry (home grown)	"
9.	Lutovka	"
10.	Orel	"
11.	Ostheïm	"
12.	Windsor	"

Pears.

1.	Beurrée Durandeau	Not B.
2.	Beurrée Gifford	"
3.	Bon Chrétien William	"
4.	Flemish Beauty	Bearing
5.	Longworth No. 1	Not B.
6.	Osband's Summer	"
7.	Vermont Beauty	"

Plums.

1.	Blue Damson	Bearing
2.	Bradshaw	"
3.	Canada Orleans	"
4.	Cheney	Not B.
5.	Coe's Golden Drop	Bearing
6.	Dery's Seedling	Not B.
7.	Grand Duke	"
8.	Gueü	"
9.	Imperial Gage	Bearing
10.	John Trotter	"
11.	Lombard	"
12.	Mirabelle	Not B.
13.	Moore's Arctic	Bearing
14.	Niagara	Not B.
15.	No. 54 Seedling	"
16.	Pond's Seedling	Bearing
17.	Purple Gage	"
18.	Red Wild Plum	Not B.
19.	Reine Claude de Bavay	"
20.	Reine Claude de Montmorency	Bearing
21.	St. Denis Seedling	"
22.	Saunders	Not B.
23.	Shropshire Damson	Bearing
24.	Smith Orleans	"
25.	Washington	Not B.
26.	Yellow Damson	Bearing
27.	Yellow Early	"
28.	Yellow of Normandy (imported)	Not B.
29.	Yellow Seedling	"

Currants.

1.	Black Champion	Bearing
2.	Black Naples	"
3.	Red Fay's Prolific	"
4.	Red La Versaillaise	"
5.	Red North Star	"
6.	White Dutch	"
7.	White Grape	"

Gooseberries.

American.

1.	Downing	Bearing
2.	Houghton	"
3.	Pearl	"
4.	Smith Improved	"

European.

5.	Chautauqua	Bearing
6.	Columbus	"
7.	Golden Prolific	"
8.	Industry	"
9.	Keepsake	"
10.	Lancashire Lad	"
11.	White Smith	"

Raspberries.

1.	Black Gregg	Bearing
2.	Red Cuthbert	"
3.	Red Marlboro	"
4.	Golden Queen	"
5.	White Raspberry	"

Strawberries.

1.	Red Bush Alpine	Bearing
2.	Red Lovett	"
3.	Red Sharpless	"
4.	Red William Belt	"
5.	White Alpine	"
6.	White Bush Alpine	"

FRUIT CONDITIONS IN VICTORIA COUNTY DURING 1904.

By Thos. Beall, Lindsay.

I have the honor to report: That the summer of 1904 has been unfavorable for fruit growers in this neighborhood. Strawberries were almost a total failure. Raspberries but little better. Currants but little more than half a crop. Gooseberries, however, especially the Whitesmith, were a good crop, a full average. Cherries and plums were a total failure. The apple and pear crop on the whole was very unsatisfactory; for although a good crop of most varieties of summer and fall apples was grown, and much less injury resulted from insect and fungous pests than usual, the wind storms which prevailed before the several varieties were fit for market, lessened the total value of the crop by one-third or perhaps more. But the most serious loss was discovered upon finding that a large proportion of the most valuable varieties of winter apples, trees such as Northern Spy, Ontario, some of the Russets, and many others, had either died before the spring opened or were found then to be in such a very unhealthy state, that they died as the season advanced. Our experience with pears is about the same as with winter apples. Many trees are dead, and the crop from those which survived was much below the average. Clapps' Favourite produced less than one-tenth of an average crop, Flemish Beauty about two-thirds, Josephine de Malines about one-fifth and Bartlett, none. All the trees of these four varieties seemed to be in a healthy state in the spring, and, at the present time appear to be quite healthy. Large numbers of other varieties, however, which had been planted within the past five years, mostly as experimental work, died through the winter or soon after leafing out in the spring.

The cause of this great loss of fruit trees is generally attributed to the supposed extreme cold of the past winter and this opinion appears to many persons to be corroborated by the official Meteorological reports, where it states and quite truly, that the "mean temperature of the last winter was the lowest on record." But this statement is not equivalent to saying that the coldest *winter weather* on record was that of the last winter. The "mean temperature" of the past winter at this place was 10 degrees 13 minutes, but the "*lowest* temperature" of the winter was 26 degrees 9 minutes on the 19th day of January, viz.: 37 degrees lower than the "mean temperature" of the winter, and this was not extremely low, for, in eleven of the twenty-three winters preceding that of 1903-04, the temperature reached from one to fourteen degrees below that of January 19th last, and during all those years it would be difficult to show that the death of a previously healthy apple tree, ten or fifteen years old was caused by extreme winter cold. Some other cause should therefore be found for this calamity and perhaps we may not have far to look for it. It will be remembered by some that many varieties of winter apples did not ripen as well as usual in the fall of 1903, and close observers could have noticed that the foliage of such trees was not in its usual healthy conditions. And further, in the spring following, they could have seen that many, perhaps most of the pear fruit-spurs, were only about one-half developed. It was among such that the dead and dying trees were found in the spring of 1904. Might not this have been caused by lack of rain in the autumn? The records of the past twenty-four years show the average depth of rain-fall for September, October and November to be 8.5 inches, and that for the same period in 1903 to be only 4.56 inches, showing a deficiency of 3.94 inches.

Now, I will leave this matter in your hands for further consideration, having but little doubt you will conclude with me, that this shortage of rain-

fall during the three autumn months of 1903, of 88.256 gallons per acre might have caused the great injury to our orchards above referred to.

REPORT OF COMMITTEE ON FRUIT EXHIBIT AT THE SHOW.

Your Committee on fruit exhibition begs leave to present the following report:

Much praise is due to the organizers of the Exhibition of the Fruit, Flower and Honey Show which has been held in the course of the present week in the city of Toronto. In visiting the Exhibition your committee has been very favorably impressed by many of its prominent features, and thinks fit to make the following remarks about some of its features. In class No. 1. Section 1, Commercial Division, barrels ready for Shipment, show a very meritorious class of work and should serve as a lesson in the preparation of fruit for export. In section No. 2 of the same class, boxes of unwrapped fruit ready for shipment present a beautiful lot of fruit, but do not, however as a whole, exhibit a uniformity of boxes and tightness in packing in some instances. In section No. 3 of the same class, boxes of wrapped fruit for shipment, we find another fine lot of fruit, but somewhat loosely packed, but with too light tissue paper for any protection of the fruit. Yellow tissue paper used in some boxes would be good if it were white.

Some barrels of class No. 2, Section No. 1, Fruit for Domestic and Home Market Varieties, show more care in facing and packing, but class No. 1, in the same class, (boxes) of section No. 2 deserves the same criticism as boxes of section No. 2 of Class No. 1.

In class 6, pears show an extra good tight packing, but the wrapping is rather faulty in that it does not present a smooth surface.

Class No. 8 presents a very interesting exhibit of grapes. The best educational part of the Exhibition is by far the various collections of fruit exhibited in class No. 10, provided by Agricultural and Horticultural Societies, Fruit Growers' Associations and Fruit Experiment Stations. There one can see the influence of climate on the coloring and size as well as the difference from early to later packing of fruits. These were disposed of in a very artistic and attractive manner and is a credit to those in charge of them. The educational value of the Women's Institute Department at the Exhibition is worthy of special mention and is one of the characteristic features of the Exhibition. We have particularly remarked as very useful for the education of the public the exhibits from the Ontario Agricultural College consisting of waxed fruits, specimens of parasites, insects and diseases of trees and fruit, and it is to be hoped that this Department of the Exhibition will be enlarged in the future.

For the Committee,

J. C. Chapais,

Chairman.

REPORT OF JUDGES ON APPLE CLASSES.

To the Fruit Committee, Ontario Fruit, Flower, and Honey Show.

We beg leave to report as follows on the exhibit of fruit shown in the Commercial and Amateur Divisions.

A.—Class 1.—Export or Foreign Market Varieties.

Barrels ready for Shipment. The six sections in this class were fairly well filled in all, except Greening, which had only one exhibit, but that was well grown, clean, and well packed.

The Baldwin, Ben Davis, King, Russet, and Spy, were shown in sufficient numbers to make competition interesting and were for the most part fairly well selected, and packed. In several instances the barrels were not as well made, and as strong as could be desired for shipment long distances by rail or by sea. This was of course taken into consideration in the decision.

We would here suggest, that exhibits of fruit packed for market should not be opened until the judges have examined the *package*, and tested it for *slackness*.

Then in the case of barrels, open the "tail" end, for the examination of the fruit and packing. When this is done, close the barrel and open the head for examination of the facing, and for exhibition.

In this way the fruit may be thoroughly examined without injury, and without disturbing the face.

Boxes ready for Shipment (fruit unwrapped). In these sections, there was a fair competition, most of the fruit being very good and well selected, but in many instances there was evidence of a want of skill in packing so as to get a good *face*, and a tight *pack*. These difficulties can only be overcome by practice, and close attention to minor details, which cover the whole of the packer's art.

Boxes ready for Shipment, (fruit wrapped). Here we also found much loose packing. In some instances the paper used was too stiff and thick, so that at first the box would seem full; but later, as the fruit sweat, and the paper gave way to the dampness, the box would be slack.

To test the fruit, we opened some 5 or 6 specimens taken at random from each box, but we paid more attention to the packing, and package, to see that it would carry safely to its destination, than to the quality of the fruit enclosed: as no matter how good the fruit may be when picked if it arrives in a damaged condition from bruising, it is worthless in the market.

Class 2. Domestic or Home Varieties.

Barrels ready for Shipment. In these sections there was not much competition, but the fruit was good, and well packed as far as we could tell, but some of the barrels were poor, and scarcely suitable.

Boxes ready for Shipment. In the named varieties there was not much competition, but some very good fruit. Section "Any other Variety" was well filled, and the prizes awarded, first, to Wagener, second, to Hubbardston, third, to Ontario.

B. Amateur Division.

Class 3. Dessert Varieties.

Section 28. Three sorts 5 each. This section was well filled, good fruit, well selected, and for the most part good varieties, for dessert.

Section 29. The two varieties entered in this section were not new but well known, described, sorts: they were ruled out.

Section 30. In this Section we would suggest that conditions be appended, giving location, age, and history, of original tree, season of ripening, and name, etc., etc. So that any new seedling of value can be traced and brought into cultivation, if desired.

Class 4. Cooking Varieties.

Section 31. Three varieties. This section was also well filled, the fruit good and correctly named.

Section 32. In this sec. Bismark is shown as a new variety.

Class 5.—Special Exhibit. Collection of Varieties.

There were only three exhibits of exceptionally well grown fruit, and the competition was close.

PEARS.

We can only say that the Exhibit was very good and the comments on the packing of Apples in Boxes will apply as well to pears.

In conclusion we will say that we are much pleased with the quality and appearance of the fruit shown, and that Ontario need not fear competition with the world in her special varieties, or those suited to her soil and climate.

Signed, R. W. STARR,
G. H. VROOM, Judges.

THE FRUIT, FLOWER, AND HONEY SHOW.

The horticultural interests of Ontario have been obviously advanced by The Provincial Fruit, Flower and Honey Show held in Toronto, November 15-19. The exhibits, in all sections, were ahead of expectations, and were a revelation of the importance of the horticultural interests of the Province. The thousands of people who attended have been thoroughly awakened to the fact that fruit, flowers and honey are three important products of Ontario; that there is a possibility for great development in this direction and that everything possible should be done to forward the interests of these three allied industries.

This impression having been created it is generally felt that the exhibition was a decided success, that it should be repeated next year, and that there is every reason to believe that this first show will develop into an annual affair of great importance. The exhibits of fruit, of flowers and of honey were the largest that have ever been made in Canada and the quality of the exhibits was of the best.

Toronto has held some splendid flower shows in the past but this year's display set a new mark of excellence. The exhibit of fruit was also a record breaker. Owing to the lateness of the season the apples shown were well colored which added greatly to the pleasing effect of the display. More honey was shown than at the Toronto Industrial Exposition and the exhibits were arranged to the best possible advantage. This made the apiary section one of the features of the exhibition.

The show was held in the two Granite rinks, on Church street, the flowers being on view in the smaller of the rinks and the fruit and honey in the larger. Both rinks were tastefully decorated, the former by ever-greens wild smilax, and palms and the latter by bunting and flags. The combined effect of the decorations and exhibits was most pleasing.

The educational features were so well arranged that the average fruit grower might have spent a couple of days very profitably examining the exhibits and questioning the exhibitors. In many cases the exhibits bore printed cards or slips of paper explaining their educational features.

The exhibits made by the fruit experiment stations, which are located in different sections of the province, were very instructive. The main portion of this exhibit appeared on an elevated stand in the centre of the hall

and attracted general attention. The experimenters who exhibited were the superintendent, Mr. Linus Woolverton, of Grimby, and Messrs. Harold Jones, of Maitland, for Eastern Ontario; W. H. Dempsey, of Trenton, for the Bay of Quinte district; Chas. Young, of Richard's Landing, for St. Joseph's Island and Algoma; G. C. Caston, of Craighurst, for Simcoe district; M. Pettit, of Winona, for the Wentworth district, and W. W. Hilborn, of Leamington, for the Essex district.

An important part of the exhibit, as compared with former years, is the separation of the desirable from the undesirable varieties of fruit. For example Mr. M. Pettit, of the Wentworth station, who is showing about 127 varieties of grapes, when asked to set aside those which he considered profitable to grow from a commercial standpoint, selected about 13 kinds, or about one-tenth of the total number. These varieties were, of the black grapes, Campbell, Worden, Concord and Wilder; of the red, Lindley, Delaware, Agawam, Catawba and Vergennes, and of the white, Niagara and Moore's Diamond.

A similar result occurred with Mr. Dempsey's collection of apples, for he set aside nearly 100 varieties which he had tested and proved unprofitable. His complete list for profit was as follows, named in order of ripening: Duchess, Gravenstein, Alexander, Trenton, Wealthy, Fameuse, McIntosh, Blenheim, Greening, King, Ontario, Hubbardston, Spy, Ben Davis and Stark, of which he could not show the first four, as they were past season. Some of these were useful for both dessert and cooking, but for dessert he would add Garden Gem, Cox's Orange, Banana, Boiken and Swayzie.

The St. Lawrence station, conducted by Mr. Harold Jones, showed three hardy varieties as the most profitable in that district, viz., Snow, Scarlet Pippin and McIntosh. Three pyramids of these varieties formed an attractive feature of the exhibit. Four other varieties not on exhibition have proved profitable also, viz., Duchess, Alexander, St. Lawrence and Wealthy, but the latter is not equal to the same variety grown along the Ottawa valley.

The Algoma exhibit was a surprise to many showing fair samples of Alexander, Wealthy, Wolf River and Longfield, varieties which will do well in that climate, with the Duchess to precede them. The Japan plums, Mr. Young reports, have done well in St. Joseph's Island, especially Burbank and Ogon. In Simcoe county and the Lake Huron district nearly all the varieties do well which succeed in the Bay of Quinte district, and splendid samples are exhibited by Mr. Sherrington, of Walkerton, and Mr. Caston, of Craighurst.

Fruit Packing Demonstrations.

A large space at one end of the rink was occupied by representatives of the Dominion Fruit Division, of Ottawa, who gave demonstrations in packing fruit for export and exhibited boxes and barrels suitable for the trade. The exhibit included packing house utensils, a packing table, presses, etc. Talks were given at frequent intervals explaining the special features of the work and important points relating to fruit packing. About 50 barrels of fruit were handled in the demonstrations and valuable information was given in regard to the Fruit Marks Act. This work was in charge of Mr. P. J. Carey, of Toronto, and Mr. A. Gifford, of Meaford, Dominion fruit inspectors, assisted by two expert packers, Messrs. R. Wilson and G. H. Boone, of Thornbury. The Fruit Division also made an exhibit of fruit from the different provinces, including 19 plates from Nova Scotia, 11 from Prince Edward Island, 27 from Quebec and 7 plates and 2 pyramids from

British Columbia. The Quebec exhibit showed the class of apples that can be grown in the colder sections of Ontario, Quebec and the Northwest Territories. These included some Russian varieties and seedlings that have been tested.

The Nova Scotia fruit closely resembled that of Ontario and included such varieties at the Stark, Greening, Baldwin and Gravenstein. The fruit from Prince Edward Island was not as large as that from the other provinces, but was fairly well colored and included some Wealthy, Baxter, Ontario, Fallawater and Baldwin apples, all of which showed good keeping qualities. Some of the finest commercial Spys in the rink were included in the British Columbia exhibit. They were of fair size and very even in quality and color. The other varieties, such as Ontario, Stark. Canada Red and Spitzenberg, were hardly up to the standard of the Ontario fruit.

A small exhibit, but one of excellent quality, was made by Mr. Richard Veale, of Mount Brydges, who showed five plates of Kings, Russets, Baldwins, Greenings and Spys. These apples were all of large size and excellent quality, the Spys and Russets being particularly fine.

A large table was occupied with an exhibit of fruit from the orchards of Morris and Wellington, of the Fonthill Nruseries. This exhibit included some excellent fruit.

One of the best exhibits at the show was that made by the Chatham Fruit Growers Association. This exhibit attracted general attention and proved a splendid adverisement for that association, as the fruit was all of excellent quality, it was neatly packed and showed to excellent advantage The exhibit included fruit in boxes and barrels as well as on plates.

The Fruit Growers' Enemies.

A most valuable section, from an educational standpoint, was that occupied by a display from the Ontario Agricultural College. A large number of the most common insects which plague fruit and vegetable growers were shown in bottles. These included the peach borer, the celery caterpiller, spruce gall louse, round headed borer, cabbage borer, canker worm, squash bug, and many others. Branches of trees and leaves, showing how these various insects attack the trees and the damage they do, were shown. These included leaves attacked by shot hole fungus, currant leaf spot, asparagus rust and others, as well as exhibits showing the apple scab, bitter rot, sun scald, San Jose scale, etc.

Printed slips of paper describing the various pests and how they can best be prevented and remedied were attached to the various exhibits. There was also an exhibit of a section of a tree showing how trees can be protected from mice, as well as branches of trees showing how grafting is done. One of the best features of the college display was two cases of waxed fruits which were wonderfully natural. The college received a great deal of praise for making such an excellent and instructive exhibit.

Commercial Exhibits.

A number of well known firms made exhibits of fruit boxes, orchard machinery, etc. These exhibits were among the most instructive of the exhibition, although the number was not as large as had been hoped for. Next year it is probable this class of exhibits will be much larger.

The following is a list of the prize winning exhibitors of fruit:—

PRIZES AWARDED.

Apples, Commercial Division, Export Varieties, Barrels Ready for Shipment.

Baldwin, 1, Chatham Fruit Growers' Association; 2, Harry Dempsey, Rednerville; 3, Biggs Fruit Co., Burlington.
Ben Davis, 1, Chatham F. G. A.; 2, Harry Dempsey; 3, Frank Dempsey, Albury
Greening, 1, Chatham F. G. A.
King, 1, Biggs Fruit Co.; 2, Elmer Lick, Oshawa; 3, H. J. Scripture, Brighton.
Russet, 1, Harry Dempsey; 2, Frank Dempsey; 3, Chatham F. G. A.
Spy, 1, A. E. Sherrington, Walkerton; 2, Biggs Fruit Co.; 3, D. T. Elderkin, Toronto.

Boxes Ready for Shipment.

Baldwin, 1, Elmer Lick; 2, Robert Thompson, St. Catharines; 3, W. H. Bunting, St. Catharines.
Greening, 1, Chatham F. G. A.; 2, W. H. Bunting; 3, Ernest Woolverton, Grimsby.
King, 1, Chatham F. G. A.; 2, Biggs Fruit Co.; 3, Elmer Lick.
Russet, 1, Harry Dempsey; 2, Elmer Lick; 3, Chatham F. G. A.
Spy, 1, C. W. Challand, Marburg; 2, Biggs Fruit Co.; 3, Robert Thompson.

Boxes (Fruit Wrapped).

Snow, 1, Chatham F. G. A.; 2, A. D. Harkness, Irena; 3, Harold Jones, Maitland.
King, 1, Chatham F. G. A.; 2, Elmer Lick; 3, Biggs Fruit Co.
McIntosh, 1, A. D. Harkness; 2, Elmer Lick.
Spy, 1, Biggs Fruit Co.; 2, A. E. Sherrington; 3, Elmer Lick.

Domestic Varieties—Barrels Ready for Shipment.

Wealthy, 1, Biggs Fruit Co.; 2, Harry Dempsey; 3, Frank Dempsey.
Blenheim, 1, A. E. Sherrington.
Gravenstein, 1, Elmer Lick.
Hubbardston, 1, Harry Dempsey.
Bellefleur, 1, Frank Dempsey.
Any other variety, 1, Harry Dempsey (Ontario); 2, A. M. Smith (Princess Louise).

Boxes Ready for Shipment.

Blenheim, 1, Biggs Fruit Co.; 2, A. E. Sherrington.
Gravenstein, 1, Elmer Lick.
Bellefleur, 1, W. H. Bunting; 2, G. B. McCalla, St. Catharines.
Any other variety, 1, Elmer Lick (Wagener); 2, Harry Dempsey (Hubbardston); 3, Frank Dempsey (Ontario).

Amateur Division—Dessert Varieties.

Any three varieties, 1, C. W. Challand; 2, A. D. Harkness; 3, Biggs Fruit Co.; 4, Harry Demspey; 5, A. M. Smith.
Any seedling, 1, J. I. Graham, Vandeleur; 2, Robt. Thompson.

Cooking Varieties.

Any three varieties, 1, Biggs Fruit Co.; 2, W. H. Bunting; 3, J. L. Hilborn, Leamington; 4, Geo. Ott, Arkona; 5, G. W. Hodgetts, St. Catharines.
Any new varieties, 1, A. E. Sherrington (Bismarck); 2, A. M. Smith (Sutton Beauty).
Any seedling, 1, G. B. McCalla; 2, Robt. Thompson.

Special.

Collection 6 winter varieties, 1, C. W. Challand.
Collection 3 varieties pears, 1, W. H. Bunting; 2, A. M. Smith; 3, Biggs Fruit Co.

PEARS—EXPORT VARIETIES.

Halfcases Ready for Shipment (Fruit Wrapped).

Anjou, 1, W. H. Bunting; 2, A. M. Smith.
Bosc, 1, G. B. McCalla; 2, Robt. Thompson.
Clairgeau, 1, G. B. McCalla; 2, Robt. Thompson; 3, W. H. Bunting.
Duchess, 1, W. H. Bunting; 2, A. M. Smith.
Keiffer, 1, Biggs Fruit Co.; 2, W. H. Bunting; 3, A. M. Smith.
Lawrence, 1, Robt. Thompson; 2, G. B. McCalla; 3, A. M. Smith.
Louise, 1, W. H. Bunting.

DOMESTIC VARIETIES—11-QUART BASKETS.

Flemish, 1, Thos. Beall, Lindsay.
Seckel, ,1, G. B. McCalla; 2, W. H. Bunting.
Sheldon, 1, G. B. McCalla; 2, W. H. Bunting.
Any other variety, 1, W. M. Robson, Lindsay; 2, A. M. Smith; 3, W. H. Bunting.

GRAPES.

Agawam, 1, W. H. Bunting; 2, Robt. Thompson.
Concord, 1, Robt. Thompson; 2, F. G. Stewart, Homer; 3, W. H. Bunting.
Lindley, 1, F. G. Stewart; 2, Robt. Thompson; 3, W. H. Bunting.
Niagara, 1, W. H. Bunting; 2, Robt. Thompson; 3, F. G. Stewart.
Vergennes, 1, F. G. Stewart; 2, W. H. Bunting; 3, Robt. Thompson.
Wilder, 1, F. G. Stewart; 2, Robt. Thompson.
Black grapes, 9-pound basket, 1, F. G. Stewart; 2, Robt. Thompson; 3, W. H. Bunting.
Red grapes, 9-pound basket, 1, W. H. Bunting; 2, F. G. Stewart; 3, Robt. Thompson.
White, 1, W. H. Bunting; 2, Robt. Thompson; 3, F. G. Stewart.
Black grapes, best crate, 1, W. H. Bunting; 2, Robt. Thompson; 3, G. B. McCalla.
Red grapes, best crate, 1, Robt. Thompson; 2, W. H. Bunting; 3, G. B. McCalla.
White grapes, best crate, 1, W. H. Bunting.
Hothouse grapes, collection, 1, John Chambers, Toronto.
Hothouse grapes, 2 bunches, black, 1, John Chambers, Toronto.
Hothouse grapes, 2 bunches, white, 1, John Chambers, Toronto.
General collection by Association, 1, Chatham F. G. A.; 2, Leamington Horticultural Society, special mention, Orillia Horticultural Society.

PRESERVED FRUIT.

Cherries, 1, Mrs. P. W. Hodgetts, Toronto; 2, A. M. Smith.
Peaches, 1, Mrs. P. W. Hodgetts; 2, A. M. Smith.
Pears, 1, Mrs. P. W. Hodgetts; 2, A. M. Smith.
Plums, 1, Mrs. P. W. Hodgetts; 2, A. M. Smith.
Raspberries, 1, Mrs. P. W. Hodgetts; 2, A. M. Smith; 3, Halton Women's Institute.

PUBLIC MEETING.

A mass meeting, at which the general public were invited to be present, was held in Association Hall, Toronto, on Tuesday evening, November 15. The programme was interspersed with music, and the following addresses were delivered. Hon. John Dryden, Minister of Agriculture for Ontario, occupied the chair.

ADDRESS.

BY JOHN DRYDEN, MINISTER OF AGRICULTURE, TORONTO.

The Province of Ontario excels in the three products represented at the show now being held in this city. Whenever we have undertaken to

present any of them in competition with our neighbors we have succeeded admirably. At Chicago we certainly succeeded in astonishing the people of the Union with our fruit. For the first time many of them were made to understand that this country was something more than mountains of snow and ice. On that occasion, we took the highest place and demonstrated that we had a splendid country for growing fruit. I think we did even better at the Pan-American in Buffalo. There, we came into competition with the great fruit growing State of New York, and if we did not excel always, we made them hustle to keep out of our way. I understand that the same thing is taking place at St. Louis. What is true of our fruit is also true of our honey.

All these products find a ready market. His Honor the Lieutenant-Governor said this afternoon in opening the Fair that he remembered the time when it was with considerable difficulty that you could purchase flowers in this city for functions of any kind. We have advanced a long way past that now, and send our flowers to Buffalo, Rochester, and even to New York

Our honey commands the attention of the people of Great Britain, who desire to purchase it. I am told that the only difficulty so far as marketing it there is concerned, is that the steamship companies charge too high a rate for carrying it. If this is correct, somebody ought to take hold of the matter. But although we find a great deal of fault with the transportation companies, I have never yet gone before a body of that kind and presented a case such as you can present here, without their showing a desire to remedy any abuse that might exist. If you can say to them, "Here is a great industry, but it is handicapped; we want you to help develop it," I believe they will meet you. But you must have the case presented by some one who is not specially interested in the article, or they will say to you, "You are interested, you want something for yourself." Whenever I have gone to them, representing the people of the country and have said, "I want to help develop the country and require your assistance," they were willing to help.

Our fruit also finds a ready market in Great Britain. What troubles me is that our fruit is being displaced actually on the home market by fruit that has to come hundreds of miles, to compete with it. Go to Winnipeg and you will find that they are dealing in fruit that comes mostly from outside the Dominion. Some of it may now come from British Columbia, but they are dealing largely in California fruit. The same thing is true in this city in the winter. Why is this? There must be some reason. I think I have found one reason, and it is that we have no concerted action in the disposal of our fruit in this country, such as they have in some of the countries of which I speak. I think that the time has come when we ought to look into this question and see if we cannot have co-operative action in the grading, packing and selling of fruit. Each one now is handling his own product in his own way, and his own way in many cases is a very bad way, and the fruit is not put up in the best and most attractive form. Each hunts his own market. Some succeed well because they are extensive fruit growers and know how to handle their fruit. Others who are smaller are lost and are unable to get reasonably fair prices for their product. I hope that one of the results of this Convention will be that the fruit growers will become more closely allied, and realize that there is a field for co-operation which has not yet been touched. They have some co-operation in the Niagara District now to fight the San Jose Scale. We need to bring our fruit to a common centre and have it packed by an expert packer. I have come

to the conclusion that you will have difficulty in finding in this country a single man who is able to teach the people expert packing. I do not know that I ought to be ashamed to have to say that, but I am sorry to have to say it. In St. Louis there are two men, one from the State of Oregon and the other from California, both Canadians, who went away from Canada some years ago and engaged in this business. They are expert packers. I will import one of these men with your consent and co-operation, if you say so. Or if you like it better, I will export some of our men and let them go over there and learn how it is done, and then come back and teach us. We can produce the fruit, but must remember that, in order to attract the people and induce them to buy more of it, it must be presented to them in a very attractive form. The Winnipeg dealer says, "When we send to California for fruit we know exactly what is coming, but when we send to Ontario we do not." We can overcome this difficulty by co-operation, by having a central packing house, and an expert packer to make the best of the fruit produced. This is the day of specialties, and I am talking of specializing in this particular line. The time has come for this co-operattion, and this Convention ought not to break up without grappling with the subject.

There are two other things which I hope will be the outcome of this Convention. I want to see more cohesion; I want the people to come together. I have been fighting for this for years, maintaining that the farmer must not separate himself from his neighbour. The moment he does so, he loses and his neighbor loses. Therefore I want to impress upon you the necessity of coming closer together, and uniting your efforts. Then I want to emphasize the fact that we cannot do anything in agriculture without enthusiasm. I hope that increased enthusiasm will result from this convention. A man working away off and alone on his farm, gets disheartened and is helpless; but go to him and tell him there is a better way, and he is encouraged, and will go on with fresh inspiration. I hope, therefore, that we may see as a result of this convention greater cohesion among our fruit growers and greater enthusiasm all over the country.

ADDRESS OF WELCOME.

By Mayor Thomas Urquhart, Toronto.

On being presented to the meeting by the Chairman, Mr. Urquhart said that it afforded him great pleasure to extend the welcome of the city to the three conventions meeting in Toronto. He recognized the importance to the city and country of the development of the agricultural interests. Great advances had been made of recent years in the manufacture of cheese under the fostering care of the Provincial Department of Agriculture. He considered that the time was not far distant when, in connection with some of our fruits at least, when the Province of Ontario would hold the same place in the markets of the world as she had already secured for her dairy products. Apart from the commercial aspect of the matter, the cultivation of fruit and flowers played an important part in the uplifting of the community. The world was better and brighter because of the influence they carried. One of the most pleasing things throughout the city was to observe the development of its parks and flower gardens, and an increased interest, he had observed, was being taken in these things throughout the country. He trusted that the Fruit, Flower and Honey Show would become an annual event, just as was the great Fat Stock Show held each year

in the City of Guelph, which had done so much to benefit the industries it represented. The time, he hoped, was not far distant when the city of Toronto would be able to provide a building properly equipped for a show of this kind. Not long ago, the Board of Control had reported in favor of submitting to the ratepayers a by-law for the purpose of providing $300,000 for additional buildings at the Industrial Exhibition, one of which was to be a large arena suited to such purposes as this. He hoped that the Convention would result in increased enthusiasm for the objects in which those present were interested; that the Show would be a success and continue to grow in success from year to year.

THE VALUE OF FLOWERS.

By C. C. James, Deputy Minister of Agriculture for Ontario.

This Convention marks an era in the agricultural development of the Province of Ontario. Go back in your mind to the time when this Province was covered with its primeval forest of oak, pine, maple and elm, stretching from the Detroit River on the west to the junction of the Ottawa and the St. Lawrence on the East. Into this wilderness came small bands of settlers, some from across the ocean, some from the country to the south, with the purpose of making homes for themselves. The making of a home in those days was a matter of far greater difficulty than at the present time, even in these days of strenuousness. Very soon in the little clearing in the forest there appeared that rude, crude log house, which we still find here and there as a relic of by-gone days. As the forest receded, the settler was able to show the first era of his development. He became a producer of wheat, oats and rye. A very simple life in many respects, and yet a difficult life owing to the circumstances of the times. Gradually, as his fields increased, and the marketing of this grain brought him more and more returns, he was able to add to his possessions a few cows, a yoke or two of oxen, and perhaps some horses and sheep. Now he has raised himself to a higher level in his agricultural work; he has become an owner of live stock. As he mounts upward his family rises with him. His wants perhaps are increased, but he is better able to supply them. After a while he finds that he has a surplus supply of milk, and dairying is added to the other industries. He is now a grower of grain, a keeper of live-stock, and also a maker of butter and cheese. Perhaps it has taken a generation to come to this higher level. Now, however, a very important element enters into the life upon the farm. In one part of the clearing he has set out a small orchard. It has begun to bear; the time has arrived when he is able to place upon his table apples and pears, and perhaps peaches and grapes of his own growing. Certainly he has raised himself very much higher—he thinks so and we think so,—as a producer from the earth.

In our agricultural work in this Province, we have been following the farmer through all these stages. Our various Governments and some pioneer associations, in a simple way assisted the farmer to a small extent when he was but a grower of grain. When he became an owner of flocks and herds, it was found important and necessary to form live-stock associations. As he branched out into dairying, we found it necessary and important to aid and assist him in his dairy work with associations and by special instruction. As he became a fruit-grower, it was found necessary to add another association.

But the farmer, having added stock to grain growing, dairing to his live stock, and fruit growing to his other industries, has not reached the highest point in his agricultural development. The little log house has been overhadowed by the more pretentious farm buildings, a neat frame or perhaps a beautiful brick house. The old log stable has been thrust into the background by the magnificent new barn, and has become a second rate outbuilding. Now the farmer's tastes increase and the ideas of his family begin to expand, and the place he has cut out of the forest begins to show all the appearances of prosperity and thrift. His family and himself demand that, not only shall he grow grain and have horses and cattle, and have good butter and cheese upon his table and apples from the orchard, but that the house shall become more attractive, more homelike. The flowers and shrubs now come into evidence. He has added what, up to a few years ago, was considered a luxury, but which we now regard as a necessity. When the farmer's wife or the townsman's wife begins to grow flowers about the home, and to have them on the table, we feel that a higher level of life has been reached, and that the people in the home are getting more out of life because of this. When we find that flowers have become not simply a luxury but a necessity in our homes, then we may conclude that we are raising ourselves to a higher level. When the farmers and the fruit growers and the dwellers in towns and cities begin to love the trees and to cultivate flowers, then we feel that a greater hope must be springing up within them, and that there is a possibility of enjoying life unknown to those who exclude flowers from their lives. We have reached the point in Canada, especially in Ontario, when flowers have become as much a part of our daily life as fruit.

I am going to refer to the flower aspect of our convention under four heads. First, that which perhaps is likely to appeal to a large number in the community, the commercial aspect. But, some may say, is there any money value in flowers? Is there in that fine display of flowers which you will find in the Granite rink anything of a commercial aspect?

We cannot give you accurate figures as to the production of flowers in Canada, but we have available, some figures for the United States. In 1899, the United States Department of Agriculture issued a report dealing with the industry in that country, and the specialist who was commissioned to gather the information has given us a few figures showing what great proportions the industry has assumed in that country. In 1899 the flowers produced under glass were valued at twenty-two and a half millions of dollars, as follows: roses, $6,000,300 dollars, carnations, $4,000,000, violets, $750,000, chrysanthemums, $500,000, lilies and other flowers, $1,250,000, total, $12,500,000. In the business no less than fifteen thousand men were employed.

Along with this has been developed another industry,—the production of the finer vegetables under glass; so that for this department we have to add four and a half millions. We in this country, are now developing rapidly along the same lines. I would strongly recommend any of our fruit growers who are able to do so, to visit some of the large conservatories in Toronto, or the large commercial flower houses at Brampton. In the production of roses we have already been able to build up a very important trade in this country. The Hon. Mr. Dryden stated in his address that occasionally we were able to send roses from Ontario to Buffalo, perhaps to Rochester and occasionally to New York. It may not perhaps be known to all of you that this has became a permanent business, and is assuming larger proportions every year. There is a point in con-

nection with it which has not been very well understood by our competitors on the other side, but our fruit growers will understand it at once. They know that northern grown apples are superior to southern grown apples. The old rule that the farther north you can grow any apple to perfection the better its quality, the better its flavor, and the better its keeping qualities, applies also to roses—the farther north you can grow them, the longer they will last and the better they will be. The result is that Ontario roses will outlast the best roses grown farther south. You will see then, that there is a very important commercial aspect connected with the growing of flowers. These chrysanthemums have a market value. You may say that they are a luxury, but when thousands of people want them and are willing to pay for them, they become a necessity and have a market value, and our flower growers would be very derelict if they do not take advantage of that demand.

The second point to be taken into consideration is the aesthetic aspect of the business—that which appeals to the aesthetic taste, that which pleases people. If we find it attractive and pleasing to cover our walls with floral designs, and to hang pictures which represent flowers, why should we not improve upon that, and have upon our tables the original flowers with all their beauty and their fragrance?

One morning early last spring, I noticed in Queen's Park an incident that impressed me very deeply. Soon after the snow disappeared, the gardeners had set out at the southern end of the park, a little plot of hyacinths, in full bloom. I saw three little girls upon their knees beside the bed. They were petting the flowers with their hands, and every now and then one would put her head down and smell. Those three little children probably had not seen a blossom all winter, and their souls had gone out to these beautful flowers; they were drinking them in, feeding their souls, so to speak, with that which was in the flower,—they were realizing the æsthetic effect of these flowers.

The third aspect is the moral aspect. Morals in flowers? you say! Well, there certainly are no bad morals. Did you ever know a vicious man or woman to be fond of flowers? Did you ever know any man, woman or child who had an insatiable longing for and love of flowers, and was allowed to develop it, who had an immoral nature? I think we shall find it a general rule that if a man or woman who loves flowers is allowed to cultivate that love and enjoy them, the better side of their nature will be developed and not the other. The development of the love of flowers it seems to me is co-ordinate with the development of the best tendencies to be found in human beings.

My fourth point is an outcome of the other three, flowers have an educational value. If flowers have a commercial value, an aesthetic value and a moral value, it seems to me that we ought to do all we can to help the development of flowers in our midst. This ought to receive the encouragement of all persons, and ought to be incorporated in the school system of our country, not that the children may know more, but that the instinct which calls for flowers may be developed. It seems to me that in connection with the new development of our school work in our towns and cities, here is one way whereby the study of nature may be brought in, to the very great improvement of our school work. There is in every boy and girl a natural friendship for flowers, and if there are various simple ways by which that instinctive longing for flowers may be cultivated, we shall be instilling into these boys and girls a love, not only for the best to be found in nature, but a love for the best to be found in human

beings as well. If we can scatter flowers everywhere through the whole community, bring them up to our door-steps and windows in summer, bring them into our homes in winter time, we shall be bringing into our schools, into our homes, and into our lives, that which will help and that which will tend to elevate. What a picture one can build up in his mind, if he allows his imagination to have free rein, of the development of all lines of the fruit growing industry to their fullest extent,—of the encouragement of flower growing, not only around the homes of farmers, but around the cottage homes and in our towns and villages and cities,—if we could bring these flowers to all our citizens, and at the same time bring to them fruit in such perfection as we see it at this show, what a wonderful improvement would be brought into the life of the people. This Association can do a great deal, not only in the development of the commercial life of the country, but in the development of the moral life as well; and perhaps in our conferences it will help us to solve some of the many difficult problems with which we have to contend if we know that by this work we are seeking not only to make life brighter but at the same time to make it better.

WHAT THE LITTLE BEE IS DOING.

By Dr. James Fletcher, Central Experimental Farm, Ottawa.

The bee is doing a great deal that the world does not know of, and it is not doing a great deal that the world thinks it is doing. Webster's dictionary defines an insect as "something small and contemptible." The bee is a very little animal; everything is small or large by comparison. The better we understand things the better are we able to put them in their right places. The time is coming when we shall know more about these common things around us and appreciate them at their proper value. All the beautiful things around us which go to make life worth living, are just those things which, until the last year or two, have been left outside the ken of nearly everybody. I have lived, however, to see the day when education is becoming so practical that boys and girls are being taught by learning of nature a little more about the common things that touch them every day. These things are just as useful, and more so, in training the child to use its mind, as all those uninteresting things which we found in our school books some years ago. The boys and girls of to-day should make better and more useful men and women than we are to-day because they have better opportunities and a more practical education which will teach them to understand more of the common things about them.

The bee has made itself so well known that it has been a proverb for many generation, but the knowledge we have gained respecting it has only proved to us how much more there is to learn. You educationists, who are teaching boys and girls to use their eyes with nature study, teach them about the bee. It will teach them a great deal more than many other insects because they can get it at all times and study it. Every boy and girl should know something about bees because they are common,—not because they are interesting or instructive or profitable, but because they see them every day and therefore ought to know something about them.

In nature all the different component parts are part of each other. As the animal cannot live without oxygen which the plant makes, so would the plant cease to live if it were not for the carbonic acid gas which the

animal makes. This wonderful balance of nature may be summed up in two general statements,—that without animals no vegetation could exist, and without vegetation no animals could exist.

There are one or two facts about this world of nature which cannot be mentioned too often. First, nature makes things perfect as a general scheme, and when man by his operations interferes with nature he may mar it, but grand old Nature is going to bring that object back to perfection. The horticulturist may make new varieties, but what would become of them if he did not keep at his efforts? They would gradually go back to their original form, which is what nature wanted. We say they are "improved." That chrysanthemum is a much more beautiful flower than the wild groundsel from which it has sprung; that is to say, we think it is more beautiful, but it must not be forgotten that what nature makes is perfect for what it has to do in the world.

The most useful thing perhaps, that bees do, is to secure the pollenization of flowers, from which fruit is produced. To the ordinary individual fruit is something nice to eat and to look at, but to the botanist the fruit is simply that part of the plant which contains the seed.

Nature always performs her work in the same way, and that is by the aid of two or three sets of workers. Of the different parts of the flower, some are essential for the production of fruit, and some are merely protective coverings to guard it from injury. In the central division of the flower we find two necessary workers, without which the fruit and the seed cannot be produced. It is necessary that the pollen from one essential part should come into contact with the pistil, the other essential part, before we can have fruit produced. Not only so, but although many flowers can be fertilized with their own pollen, when the pollen is brought from another flower of the same kind, it is of far greater advantage to the plant, as shown by the vigor and development of the progeny. Darwin laid down the law that nature abhors self-fertilization or dislikes the fertilization of a plant by its own pollen. To convey the pollen from one flower to the stigma of another, nature has provided two great mediums, first, the elements, water or air, and second, insects, and of all the insects the honey bee is of the greatest use among cultivated plants and fruit trees.

Honey is more than a luxury; it is a utility. Mr. Dryden suggested that a useful line of trade could be developed in this direction. It is being developed, and let me say that no honey is better than our Canadian honey. Our flowers produce lots of nectar and lots of pollen which are the two foods of the bee.

Bees are commonly accused of things they do not do. People talk of bees when they do not mean bees at all. Unfortunately there is a great lack of knowledge among our people of the useful and injurious insects which affect the revenue of the country so much. It is almost as true today as it was twenty years ago, when the statement was first made, that to most people in this country, anything smaller than a cat is a bug. Many insects that get credit for being bees look like them but are not true bees, such as the bumble bee and the false bumble bees, which are really flies. They are parasites of the bumble bees and look like them. But people are beginning to know that many of the misstatements about bees are misstatements. In this connection, one of the best things that ever happened to the bee industry was the unfounded charge made by fruit growers some years ago that bees destroyed their fruit. This the bee-keepers denied, and took the trouble to ascertain the facts and to show fruit growers that it was not true, and could not possibly be true. Most people speak of bees and

wasps as the same thing, whereas they are very different and have different habits. Bees do not eat fruit and wasps do. The bee feeds on nectar and pollen, nectar being the substance which the bee converts into what we call honey. Nectar as it exists in the flower is not honey as we understand it; the honey is manufactured from it by the bee, and is put up in those perfectly made cells, with an antiseptic added to keep it from spoilng. The wasp is supplied with cutting jaws with which it gnaws wood to make paper for its nest. The bee has feeble jaws, strong enough to make wax cells, but not strong enough to eat fruit; it is not possible for them to do so. Nectar is the food of the bee, and pollen is the food of the young bee. It is necessary to mix it with nectar to make pan to feed the young brood with.

Those pollen grains which depend on wind for carrying them are exceedingly light. They are known in some instances, from actual observation to have been carried 200 miles. In the willow, the male and female flowers are on two distinct trees. On some plants we find perfect flowers, where all the essential parts occur either in the same flower itself or in different flowers of the same plant. In such cases we should suppose that fertilization would be a very easy matter, but as outside pollen is required in order to keep up the strength, vigor and perfection of the plant, nature makes it difficult in various ways,—in some instances by making the pollen sterile or even poisonous, to its own pistil.

The devices which enable plants to secure pollen from other plants are very diversified in nature. Some flowers can only give up their pollen on contact with a firm object such as the trunk or tongues of certain insects, as bees, moths, etc.

If the bee went from place to place and took honey from every flower it came to, the honey would be of all colors and flavors; but because of the habit so well known to bee-keepers of bees visiting one kind of flower at a time, this difficulty is avoided, and the visits of the bees are of great benefit to the plants by pollen being carried from flower to flower. Why do bees go to flowers at all? They go for two things, nectar and pollen; and they go only just at that time in the development of the flower when they can be of use to the flower. The pollen is there only at one particular stage of development, and the nectar is there only at that time, or at approximately the same time. It therefore follows that flowers of a certain kind require the presence of the bees at a particular time in the season, and during that time the bee devotes its attention to those flowers alone, and because of this, honey made from them in that way should be kept distinct from different classes of honey made from other kinds of flowers.

The manifestations by flowers when certain stages of development have been reached form a very interesting study. When fertilization has taken place, the flower immediately displays signs which indicate that such is the case; scent pollen and nectar are no longer produced, and the bee is not again attracted to that flower.

A study of these little insects is worthy of the attention of everybody, and is full of surprises and interest. They are worthy of study from a utilitarian point of view. The fruit grower cannot do without the bee-keeper, and the bee-keeper, although he can do without the fruit grower, is a great deal better off because of him. The honey bee, which the fruit grower is now beginning to keep in his orchard in a small way is repaying him by fertilizing the flowers and thus increasing the yield of fruit, and the fruit grower and bee-keeper are no longer enemies but friends and are working together for the general good. I hope that this will be only the first of a long series of joint meetings of fruit growers and bee keepers.

Provincial Horticultural Convention.

The sessions of the Convention of delegates from the Provincial Horticultural Societies, held in connection with the Provincial Fruit, Flower and Honey Show, were well attended and interesting and proved a valuable feature of the exhibition.

These meetings were held in the members' assembly room at the Parliament Buildings, about half a mile from the Granite rinks where the exhibition took place. The fact that the meetings and the exhibition could not be held in the same building caused considerable inconvenience, but it had been found impossible to make better arrangements. In the event of the exhibition being made an annual affair, a determined effort will have to be made to secure accommodation that will provide for the holding of the exhibition and of these meetings in the same building.

The opening session of the horticultural convention was held Tuesday afternoon, November 15th, and was well attended. The chairman, Mr Edward Tyrrell, on behalf of the Toronto Horticultural Society, extended a cordial welcome to the delegates.

THE PLANTING OF HOME AND SCHOOL GROUNDS.

By Prof. H. L. Hutt, Ontario Agricultural College, Guelph.

For centuries past, great attention has been paid to landscape gardening in the older countries of Europe and Asia, and each country as a rule has developed a style of gardening peculiar to itself. Japanese gardeners have excelled in the production of wonderful miniature gardens. The Italian, the French, and the Dutch each have formal and elaborate styles of gardening peculiarly their own. In America, we are year by year giving more and more attention to the beautifying of our surroundings, both in public and private grounds, and while we may have copied to some extent. the landscape architects of the Old World, yet we have struck out in a broader, freer, more natural way, so that it may be said that we too are making a style of our own. The stiff, formal production of the old-time gardener is not now believed to present the artistic excellence of that of the modern landscape architect, who accepts Nature as his teacher.

In the short time at my disposal for a talk of this kind, I cannot do more than briefly discuss a few of the principles which should guide us in the beautifying of our surroundings. And it may be said at the beginning, that the same rules apply in improving either the home or school grounds, although, of course, the treatment and the effect produced in each case may be quite different.

In beautifying the surroundings of a home, a school, or any public building, the aim should be to make each a picture in itself. The building naturally stands out as the central object, the lawn or green sward is the canvas upon which we paint our picture, and the shrubs and trees make the setting or frame which completes the picture. The artist who paints such a picture has various pigments and materials with which to work out

his ideal. The landscape gardener who lays out and beautifies a place likewise has various materials with which to work out the reality. For convenience of description they may be classified as natural and artificial. Among the natural materials are the ground, the grass, trees, shrubs, vines, certain classes of plants which grow more or less naturally, and in some cases also rocks and bodies of water. The artificial materials are the buildings, drives, walks, fences, terraces, geometrical flower beds, and plants of the greenhouse type. Trees and shrubs which have been clipped into fantastic forms, may also be classed as artificial material, just as much so as fountains or statuary, which are sometimes made use of. The skill of the landscape gardener in producing beautiful effects depends upon his judicious use of such materials. The more he makes use of the natural materials, and the more he adopts Nature's methods in combining them, the more pleasing as a rule are the results.

Let me draw your attention to a few of these materials and to the principles involved in making use of them:

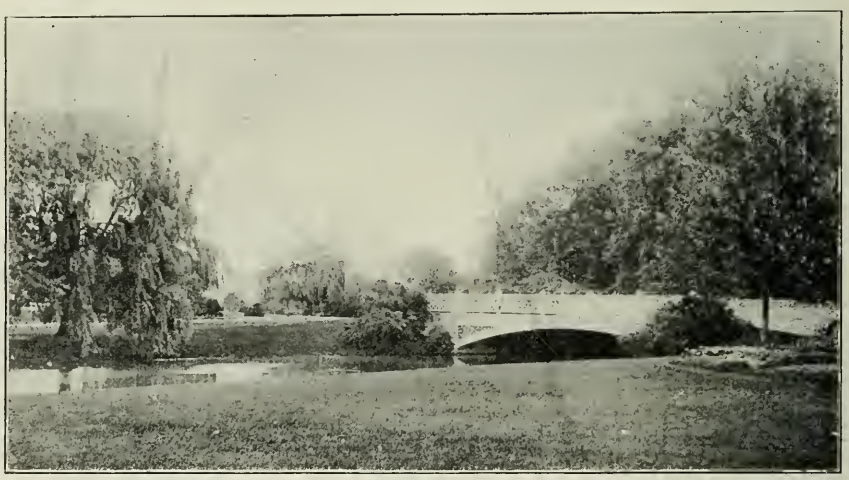

Fig. 1. Water adds a charm to any landscape.

The Ground. One of the most important features in the ground surrounding a home or school, is the contour of its surface. This is what gives character to a place. A low lying lawn, with something of a depression in the centre, has a somewhat tame, undrained appearance, while an otherwise similar lawn, with but a slight crowning in the centre, has an altogether different appearance. Sometimes a perfectly straight surface line is pleasing, and the level lawn is more in keeping with the place and its surroundings than any other could be, but as a rule some variation from the straight line is preferable. In nature, we take more delight in bold outlines of hills and valleys than we do in level stretches of country. This is because we love the variety which hill and hollow affords, and this suggests the desirability of introducing undulations in landscape gardening, whenever the size of the grounds and other circumstances will permit.

The buildings should, of course, be on the highest elevation, and the grounds should be made to slope away from them. On a steep hillside the grounds may have to be terraced, which, if well done, adds much to the appearance of a place, but also adds considerably to the cost. Whether the grounds are flat or rolling the small irregularities of the surface should

be levelled and smoothed so that the mower may be worked easily. Wherever much grading or filling has to be done, due allowance must be made for settling, and a few inches of good surface soil should always be left on top. The character of the surface soil is a matter of great importance, because on it depends the luxuriance or poverty of the grass and the trees growing over it.

The Green Sward. There are two ways of clothing the ground with grass, either by sodding or by sowing grass seed. On small plots or steep banks and along borders, sodding is the quickest and most satisfactory method, but on large areas seeding is not only the cheapest, but the best. In preparing the ground for seeding is should be plowed, harrowed, rolled and made as fine as possible, and as a final preparation nothing is better than going over it carefully with a garden rake.

The kind of seed to sow is a matter of importance. Coarse grasses, such as timothy, are not suitable for lawn making. Many of the finer and

Fig. 2. A stretch of lawn showing great variety in tree forms.

more delicate grasses may be obtained in "lawn grass mixtures," but the most satisfactory mixture we have found is made up of equal parts by weight of blue grass, red top grass, and white Dutch clover. All of these are hardy and stand well the extremes of our climate. The seeding should be done on a still day when there is no wind to carry the lighter seeds. Thick seeding should be the rule. Three or four bushels per acre is none too much for seeding down a lawn. After the seed is sown it should be lightly raked in, and if the weather is dry it is well to go over the ground with a hand roller. The work of making a lawn may be done at almost any time of the year, but where much levelling and filling is necessary it is well to do the grading in the fall, so that the ground will have finished settling by the spring, and then the surface may be raked over as soon as it is dry enough to work, and the seeds sown as early as possible. A lawn sown early in the spring should be nice and green by the middle of the summer.

or seed sown early in the fall should give a good grassy carpet early next spring

Keeping a Lawn. To keep a lawn in prime velvety condition it should be mowed frequently, particularly during the season of rapid growth. The mowings should be so frequent that none of the grass should have to be raked off. This is the practice followed on well-kept city lawns where men, money, and mowers, are available. On the farm, where these articles are not so plentiful, and where the area to be gone over is usually greater, it may be kept in very respectable condition with the ordinary farm mower, the cutter bar of which should be set low and the knives kept sharp. On the farm the front yard and back yard, the lanes and the roadsides should be levelled, seeded, and put in such condition that they can all be gone over with the farm mower, and if the mowing is done as often as the grass is high enough for the knives to cut nicely, the improvement made in the appearance of a place would in many cases add nearly 50 per cent to the value of the property.

Fig. 3. The Purple Fringe in shrubbery clump.

To maintain a luxuriant growth and a rich dark green in the color of the grass, the lawn should occasionally receive a top dressing of stable manure in the fall. The soluble portion of this is washed into the ground by the fall and spring rains, and early in the spring the coarsest portion of the manure should be raked off.

We are often asked how to get rid of dandelions in a lawn. For my part I like to see them when they are in full bloom, although of course, they make the lawn look ragged when they go to seed. It is because they are so common that we dislike them. If they grew only in South Africa we would soon import them. There is no more effective way of keeping dandelions in subjection on the lawn than by keeping the ground rich and encouraging a luxuriant growth of grass. If the ground is rich enough the grass will smother out most kinds of weeds. What cannot be smothered must, of course, be spudded.

Evergreen and Deciduous Trees. In the trees we have some of the finest forms of natural beauty. They present a great variety of ornamental qualities, in habit of growth, in size, and in color of foliage and bark. They may naturally be divided into two classes, the deciduous and the evergreen trees. On school grounds we think it is advisable to grow as many as possible of our native trees and keep them labelled, so that the children become familiar with their botanical and common names. On the home-grounds more of the foreign species may be introduced as desired.

If time permitted, we could give a lengthy list and advocate the special claim of each to a place on the lawn, but we must be content with mentioning only a few of the most desirable. Among the maples, we have the sugar maples, the soft maples, and Weir's cut-leaved variety of the same, the Sycamore maple, and the Box Elder, sometimes called the Manitoba maple, which is particularly valuable on new places on account of its rapid growth, but along with it should be planted some of the more durable trees.

Fig. 4. Beneath the Elm tree's shade.

which will come on and last long after the Box Elder has served its purpose. As a successor to it we know of none better than our native American elm. In its finest form, with feathered trunk, high spreading arms and long, pendulous branches, that is the most stately and graceful of our native trees. On large grounds, where there is room for variety, some of the oaks and fragrant lindens add a charm to the scene. The cut-leaf weeping white birch is very ornamental in both summer and winter, and shows a striking color contrast, particularly when placed so as to have for a background a group of evergreen or a dark-colored building.

Among the evergreens, the pines and spruces occupy a first rank. The Austrian and Scotch pines make handsome specimens, although when young our native white pine is equal, if not superior, to any of the foreigners. The same might be also said of our native white spruce, as compared with its more vigorous relative from Norway. But for a handsome speci-

men of Nature's coloring let us have the dainty little blue spruce of Colorada. Among the *arbor vitaes*, junipers, and *retinosporas*, there are some very beautiful forms, such as the pyramidal and globose arbor vitae, the tall Irish juniper, and the *plumose retinospora*, but these last mentioned are less hardy than the *arbor vitaes* and require protection for a few years in the colder sections of Ontario.

Ornamental Shrubs. For a list of some of the most desirable and hardy ornamental shrubs adapted to our northern section, I cannot do better than refer intending planters to the valuable list given in Prof. Macoun's report in the Central Experimental Farm Report for 1897. One hundred species and varieties are there mentioned, with twenty-five of the most desirable marked. If we were compelled to reduce the list to half of that number, we would from our own experience select the following: These are given in the order of their season of bloom, the first beginning with us at Guelph about the end of April and the last holding on till late in the autumn:

Fig. 5. A shelter belt of mixed evergreens.

1. *Forsythia*, or golden bells, in bloom about end of April, and lasts about three weeks.
2. *Ribes aureum*, or golden currant, in bloom 9th of May, lasts two weeks.
3. *Pyrus Japonica*, or Japan quince, in bloom 15th of May, lasts nearly three weeks.
4. *Caragana*, or Siberian pea-tree, in bloom about 24th of May, lasts over a week.
5. *Lilacs* in great variety, in bloom about 24th of May, last about two weeks.
6. *Bechtel's* double flowering crab, in bloom about 1st of June, and lasts two weeks.
7. *Spiraea Van Houteii*, in bloom about third week in June and lasts about two weeks.
8. *Vibernum opulus sterilis*, or snowball, in bloom about 5th June, and lasts over two weeks.

9. *Lonicera Tartarica,* or bush honeysuckles in bloom about 5th of June, and lasts about a week.

10. *Weigelia rosea,* in bloom about 5th June, and lasts nearly three weeks.

11. *Philadelphus* or Mock oranges of several varieties, in bloom about 15th of June, and last from two to three weeks.

12. *Rhus cotinus,* commonly known as purple fringe, or smoke tree, in bloom about middle of July, and plumes last till November.

13. *Hydrangea paniculata grandiflora,* in bloom about middle of August, and lasts for three or four weeks.

Arrangement of Trees and Shrubs. To artistically arrange and distribute a collection of trees and shrubs on the lawn requires much more skill and judgment than to set out trees in a straightt line in an orchard. The following are some of the rules to be observed in lawn planting:

1. *Follow the Natural Order of Arrangement.* Nature does not plant in stiff and formal geometrical lines, but rather in irregular profu-

Fig. 6. A country home adorned with Trumpet Creeper and Honeysuckle.

sion. It may be necessary to modify the natural arrangement to meet the needs of the case.

One has said that "the aim should be to exhibit nature idealized rather than nature real. A prominent American landscape gardener tells us that for his first lesson in arranging trees on the lawn, he was told to take in his hands as many stones as he had trees to plant; to stand by the house and throw them in the direction he wished the trees to stand, then plant wherever the stones fell. He says that with a few slight modifications the effect was all that could be desired.

2. *Arrange to Give an Air of Breadth and Expanse to the Place.* This is a most desirable effect, and is secured by preserving a more or less open lawn in front of the house, by scattering and grouping the larger trees

at the outside of the grounds so as to more or less hide the boundaries. This suggests an unlimited extent, beyond what the eye can see at any point. Another means is by opening vistas between the trees, looking out upon distant scenes beyond the boundaries. In this way we may shut out undesirable objects, and we may appropriate to ourselves desirable scenes such as a wooded hillside, a stretch of river, or a church spire, and thus make our little grounds seem like part of an extensive park.

3. *Arrange for Trees to Give Comfort as Well as Ornament.* One of the first considerations should be to shade the buildings from the heat of the sun and to shelter them from the sweep of the prevailing winds. On the south and west should be planted a few of the largest trees, such as elms or maples, not so close as to exclude the light from any of the windows, nor so that any of the branches, when the trees are full grown will overhang the house, but close enough that their shade will fall upon it. In all planting take into consideration what the results will be when the trees are full grown.

Fig. 7. The Boston Ivy excells as a climber on brick or stone.

As a protection against the sweeping winds of winter some of the strong growing evergreens, such as pines and spruces, are most useful. Thick belts or clumps of these should be planted on the most exposed quarters, and along with them may be planted a few of the light-colored deciduous trees. In winter the evergreens give a cosy appearance to the place, and in summer their sombre darkness is relieved by the bright green of the deciduous trees.

In arranging the smaller trees and flowering shrubs, these may be grouped into ornamental groups, or occasionally fine specimens may stand out by themselves. When grouping into clumps, the tallest-growing specimens should be placed in the centre; and along the border, the smallest shrubs should come to the front so as to blend the grass with the taller trees in the background.

Beautiful color combinations and contrasts, both in flower and foliage may often be arranged if the planter understands his work. For instance, a beautiful color contrast is obtained by planting a purple-leaved barberry near a golden-leaved spiraea or a dark Austrian pine as a background for one of the light-colored Colorado spruces.

Vines and Climbers. Among the vines and climbers we have a number of beautiful species which may be made very effective in many ways in beautifying the home surroundings. They are particularly valuable on small grounds and town lots, as they take up so little room, but they are also quite as valuable in beautifying a country home. One of the most hardy and vigorous is the common Virginia creeper. This is excellent for covering a summer house or an unsightly wooden wall. As a covering for a brick or stone wall the Boston Ivy (Ampelopsis Veitchii) is one of the handsomest. In northern sections it requires winter protection for the first few winters, but when once established it grows rapidly, and will soon convert a brown or red front into a wall of living green. For a handsome, hardy flowering climber we have nothing to equal Clematis Jackmanni, with its large purple flowers; and Clematis paniculata, with its innumerable small white flowers late in the fall. Hall's climbing honeysuckle and the Chinese Wisteria are beautiful climbers, well adapted to climbing verandah posts or festooning a balcony, but they will not stand our winters without protection except in the southern parts of the Province.

Flower Borders. Mixed flower borders at the side of the lawn, or along the drive or walks, are far more satisfactory and in better taste than fancy shaped beds cut out of the sod in a prominent place on the lawn. Every home and every school ground should have its mixed perennial border. Such a border may be stocked with an endless variety of bulbs and hardy plants which give a continuous bloom from the time the snow is off the ground in the Spring till it falls again at the beginning of winter. Our perennial borders at the College are one of the special attractions for thousands of visitors during the month of June. Most of the plants for such a border may be grown from seed or may be purchased very cheaply from the leading seedsmen. The following list includes a few of the most desirable kinds, and it might be extended indefinitely:

Achillea, "The Pearl."
Adonis vernalis.
Agrostemma coronaria (Mullein Pink).
Aquilegia chrysantha (Golden Columbine.)
Aquilegia coerulea (Rocky Mountain Blue Columbine.)
Asclepias tuberosa (Butterfly Weed.)
Aster novae angliae (Wild Purple Aster.
Bellis perennia (English Daisy.)
Bocconia cordata (Plume Poppy.)
Calliopsis lanceolata.
Campanula carpatica (Carpathian Bells.)
Campanula media (Canterbury Bells.)
Convallaria majalis (Lily of the Valley.)
Crocus in variety.
Dianthus barbatus (Sweet William.)
Diclytra spectabilis (Bleeding Heart.)
Digitalis (Foxglove.)
Doronicum caucasium.
Funkia subcordata grandiflora (Giant Day Lily.)
Gaillardia grandiflora.
Gysophila paniculata (Baby's Breath.)
Helenium grandicephalum striatum.
Hemerocallis flava (Yellow Day Lily.)
Hollyhock.

Iris Germanica (German Iris.)
Iris Kaempferi (Japanese Iris.)
Lilium in variety.
Lobelia cardinalis (Cardinal Flower.)
Lychnis chalcedonica.
Mertensia virginca (Blue Bell.)
Myosotis (Forget-me-not.)
Narcissus in variety.
Paeonia (Paeony.)
Papaver nudicaule (Iceland Poppy.)
Papaver orientale (Oriental Poppy.)
Phlox, hybrid perennials in variety.
Phlox subulata (Moss Pink.)
Platycodon grandiflora (Chinese Bell Flower.)
Rudbeckia lanceolata (Golden Glow.)
Scilla Siberica.
Tulips in variety.
Valeriana offcinalis (Garden Heliotrope.)
Veronica in variety.
Vinca minor (Periwinkle or Trailing Myrtle.)
Viola cornuta (Tufted Pansy.)
Yucca filamentosa (Adam's Needle.)

Walks and Drives. These are not in themselves very ornamental, but they are necessary and have an important effect in the appearance of a place.

When properly located they convey the idea that the place is inhabited, and they seem to impart an air of welcome.

As the walks and drives are artificial, and not in themselves ornamental, there should be as few as possible. Business roads should as a rule be straight, but pleasure drives give more pleasure if they are laid out in graceful curves. The curves give variety, and help to relieve the angular outlines of the buildings. They should not, however, be introduced at the expense of utility, and should offer no temptation to take short cuts across the grass. Whenever a curve is introduced there should be trees, or some object in the road to make the curve appear necessary. If such are not there when the drive is laid out, they may be planted afterwards. A curve without some apparent cause for it looks meaningless and affected.

The drive, whenever possible, should enter at the side of the lawn, and curve gently around towards the buildings as though it were the nearest and most natural way of approach. It should be dotted here and there along the side with trees and shrubbery, which partly screen the building from sight, so that we keep getting a different view of the house as we approach. This gives variety and pleasure, and always leaves just enough unseen to make us feel like following it up to see where it leads to.

The width of drives and walks should vary according to their length and the amount of travel upon them. If long and much travelled the drive must be wide enough for two rigs to pass easily, but if short and not so much used, 8 to 10 feet, or room for one wagon, is enough. Walks or footpaths will vary from 3 to 5 feet. The drive and walks should be properly graded and made slightly crowning from the centre to the sides so as to give good drainage. If good gravel is obtainable they should be covered with gravel, raked smooth and rolled hard.

Fences. As a rule fences enter largely into most landscapes, and are worthy of note. They are artificial materials, and at best they are necessary eyesores, but in the majority of cases their necessity is only imaginary. If all of the really unnecessary fences were removed, and the ground which they occupy levelled and seeded down or put under crop it would make a wonderful difference in the appearance of the country. It would remove a great harbor for weeds and insects; it would effect a great saving of labor and expense, and it would remove one of the most striking features

which advertise the slovenly farmers all over the country. The only fences necessary, or which should be necessary, are those for the purpose of fencing in our own stock, and not fencing out that of the neighbors. Fences, in many cases, might be movable or temporary. Roadside fences in many sections might be dispensed with, the ground levelled and seeded and the grass kept mowed from the boundary to the roadbed. Bill Nye says that "the farm without a fence in front of it looks as if the owner were honest and thought his neighbors the same." If a permanent fence is necessary let it be as inconspicuous as possible, or let it be an ornamental hedge.

Some of the other artificial materials sometimes used in landscape gardening are trees, trimmed into fantastic shape, fountains and statuary, flower beds of geometrical designs. All these are artificial and should be used with as much discretion as one should use in wearing fine jewellery. The more the artificial prevails in the general surroundings the more these can be used without giving offence. In proximity to large and expensive buildings, or in extensive parks, they may have their place, but on the farmer's lawn, where most of the surroundings are natural, and where the buildings are not elaborate and costly, they would be altogether out of place.

Q. What do you think of the Catalpa as an ornamental tree for lawns?

Prof. Hutt: It is useful for variety. It has large showy leaves and beautiful flowers, but is so late in leafing out in the spring that it is usually bare until June. On small grounds one specimen will be sufficient, and I would not include it in the first dozen varieties to be planted. We have seven different species on the college lawn. *Catalpa speciosa* is the hardiest one.

Q. I have had particular difficulty in growing Clematis. I have tried both *Jackmanni* and *Henrii, Jackmanni* on a north-easterly exposure and *Henrii* on a south-easterly, but failed to have any success with them, both dying. Is there any particular difficulty in growing these varieties?

Prof. Hutt: It may possibly be accounted for by the poor soil around your buildings, often the sub-soil from the cellar is piled around the foundation walls, one should be sure of two or three feet of good soil before planting climbers. They also want plenty of moisture and are robbed of this by overhanging roof or eaves. I do not think the exposure makes much difference; the vines should be laid down for the winter in any case. The bloom lasts longer on a northern exposure.

W. T. Macoun, Ottawa: I have had similar trouble and think it is due to the Clematis disease. This is a disease that cuts the plant off at the collar. It is supposed that this is caused by tiny worms which come out of the greenhouse and go on working around the collar of the plant until the plant dies. The plan recommended is to put the plants out in the autumn and let them freeze hard in the winter, which will kill the pest; but if you are not troubled in your district it is not wise to experiment in that way.

E. Morris, Fonthill: My observation of this blight is that it appears the second and not the first year, so that I do not think it can come from the greenhouses. So far as I am aware, the blight is still a mystery; there is no known cause and no remedy.

Mr. Macoun: My authority is the Massachussetts Experiment Station.

R. Cameron, Niagara Falls: The plants appear to have been raised of late years from grafting, and they die off, presumably from the effects of this disease. I think that all the Clematis of the *Jackmanni* type raised some years ago from cuttings are living to-day.

Mr. Morris: Has not this dying off occurred only within the last year or two?

A. For four or five years.

Mr. Morris: They are usually attacked in the second or third year; if they last for three or four years, they will stand.

A Member: That is not my experience. I had *Henrii* eight or ten years old that was killed down last year. It withered from top to bottom in six hours. Has anyone here grown any from green wood cuttings and raised them?

Mr. Morris: The bulk of the nurserymen propagate them in that way. In Holland they propagate them by grafting.

Mr. Macoun: Professor Hutt in his remarks, spoke of some of the best flowering shrubs and mentioned the lilacs. The marvellous improvement made in the lilacs during recent years is not generally appreciated. We have more than 100 varieties at Ottawa. In most gardens we see only the purple and white. Shades from the purest white to the darkest purple are now obtained both in single and double, and there are species which will extend the season for six weeks. We have them blooming from May till July 1. A partial list will be found in the Society's report of last year in a paper by Dr. Saunders.

Q. Are the Japanese lilacs of the single stem form?

Mr. Macoun: Its stem branches soon after it leaves the ground, but it starts with a single stem.

INTERESTING YOUNG PEOPLE IN HORTICULTURE.

By A. K. Goodman, Cayuga, Ont.

How can we best interest our young people in the garden and in the orchard? There is one way, and that is the best way. Become interested yourselves. Become enthusiastically interested. It is a case of "Come along boys and girls," not "Go on, boys and girls." To do any good, you must be unselfish, and in the accomplishment of any object there must be preparation.

Children's characters are more likely to be strengthened and developed along with proper lines in the brightest and happiest surroundings. Lovely flowers and green trees should, where possible, mark the abode of Canadians.

Children are imitators, and will in time, be largely what we have made them by our example. Always welcome the children in the garden and teach them as much as they are willing to learn, but never detain them when they want to play. It will not be long before they will coax you into the garden.

A busy man cannot garden all day except for profit, but the average Canadian in the small towns and villages, has enough time on his hands to make a creditable showing. I have found that it is desirable to avoid the midsummer flowers.

My garden opens with tulips. These are massed and are arranged in various ways and planted in the open to receive the full sunlight. Good drainage is provided, care being taken to avoid the roots of trees. They are planted four inches deep and top-dressed with well rotted manure. It is more satisfactory, though not necessary, to take up tulips every year. Then follow the general bedding-out, after danger of frost is over, from the hot-bed, of caladiums, geraniums, stocks, asters, ageratum, salvia, etc., while the flowering shrubs and early perennials for a time hold the place of vantage.

With June the grandest flower of all reigns supreme, until the end of July. I love to grow a rose, because it takes such a determined effort to reach the best possible. Roses love the open and need a clay soil, enriched with cow manure, lime and wood ashes, as well as freedom to expand, good drainage and deep root feeding. Plant in the fall, prune in the spring, and spray every morning with tobacco water and lime, or soapsuds. Simply conquer the insect enemy completely. Do not tolerate any half-way measures, and your reward will be a great source of pleasure to yourself and friends.

From the June roses you can go to the Ramblers (they will give you a bloom for a month if you shorten the canes, cutting the old ones out every three years), to other climbers, and to the tea roses, from which you will receive monthly crops of roses until the frost. After the roses, I satisfy myself with the formal bed, and in September enjoy a gorgeous display of asters and gladioli.

The Effect on Children.

The object of interesting our young people in horticultural work is to strengthen their morality, train their character and make them useful citizens. State education in the schools is fast changing from the old law of "Rod Rule, and Remembrance," to what was once a goal to the natural interest idea. Interest is said to be the master key of all possible education, and it conquers all. The schools of the Province are doing noble work, and horticulture and floriculture take a large part of the credit for the advance.

In Canada, we are fast entering on our growing time. The horticultural societies must plead and work for play grounds, tree planting, gardens and parks. Hundreds of our village schools are practically without play grounds. A Provincial Horticultural Society would strengthen the hands of local enthusiasts.

The joy of possession is a rule that works admirably in the garden. If a child plants and attends to an asparagus or strawberry bed, cuts or picks the product, carries it in sympathy to the sick, or, if its favorite color is planted, cared for, developed into perfection and it is then allowed to gather and give—it will soon learn to act with knowledge and discretion. To plant a grape vine, prune it, watch it attain maturity, and then to gather and enjoy its fruit thoughtfully, is the highway of wisdom.

But, first and always, cultivate and develop the inherent natural love of flowers. Work that the children may plant; care for, that the children may gather, until in time their natures will respond to the noblest ambitions of man.

Q. What material do you use for covering roses in winter?

Mr. Goodman: Old barn yard manure; old, so that it will not burn the plant or hurt it. Before applying the manure, I make a mound of earth. If I want a longer cane, I cover with common straw. You should never smother roses.

Q. What do you spray with?

A. The best solution I have used for thrip and aphis is tobacco water mixed with a little lime to make it stick. If you are preparing spray for a large number of bushes, take a coal oil barrel, fill half full of tobacco stems, fill up with cold water and leave for two days; then take the tobacco out and add a bushel of fresh slaked lime. The nozzel should be the kind that will so throw the spray as to hit the leaves underneath, so as to get at the worm that eats the leaf and causes it to curl. You must spray not once or once a week, but every morning during the time the crop of roses is on.

Mr. Macoun: I think that to a certain extent, the love of flowers is inherent; but it may be developed also. My idea is that we should begin with

children just as soon as they are able to understand the difference between root and top, and develop in them a love of flowers. We should set apart for the children the very best piece of land in our garden, of small area of course; not a piece that we cannot grow anything on ourselves. Let them plant all the kinds that we are going to plant. My little boy last summer wanted a plant of every kind that I was planting, and was disappointed if he did not get it. If the soil had been such as to cause failure, he would have been disappointed and discouraged. We should make it our business to make his garden a success. If it is a dry time, get out at night and water his garden thoroughly, without letting him know about it. A young child does *not* understand everything, and it is better to practice a little deception than to run the risk of his being discouraged by a failure.

R. B. Whyte, Ottawa: I quite agree with Mr. Macoun. Both the boys and the girls should have a little bit of ground of their own. My own children had until they were old enough to take a part in the garden. I do not know of anything that has a better effect on the child's character than to develop in him a love for growing plants, and I have done my best to encourage it in my own children. It is a comparatively easy thing to develop this love in our own children, but with city children, who never had a garden and whose parents never had one, it is difficult. Their ignorance of the subject is increditable. The most difficult problem we have to face is to cultivate in children brought up in big cities, the love of growing things. I have been disheartened in many cases to find how little the children knew and how little interest the parents took in the matter. But in other cases the parents have told me how much the children had improved since they took an interest in growing things.

Mr. Goodman: My idea was to make a partnership with the children in the garden. They might have a little piece to experiment with, but I would take them in and let them work with me and I would work with them.

Mr. Macoun: The natural desire of the child is to have something of its own. I think the idea of personal ownership is far stronger than joint ownership.

Prof. Hutt: I find that the children take great pride in having a little garden of their own. They get their plants from me, and are learning all the time by taking care of them themselves. They learn by experience, and ownership is a strong incentive to action.

A Member: I believe that a move was made in some of the Horticultural Societies recently to present children with flowers. I think that is a good plan, and if there are any representatives of such societies here, I should like to hear from them.

J. O. McCulloch, Hamilton: One of the first things the Hamilton Society did was to make a public distribution of Aster seeds to about three thousand of our children. The result was so satisfactory that we now hold a show in September, at which the children make exhibits. Last year we had a very fine display. In one particular district in Hamilton, the children became so enthusiastic that their seniors took it up and set apart five streets where they asked the people to form themselves into a society to improve their gardens, front and back. They offered prizes for lawns, boulevards, hanging baskets, and window displays. The result is, that a neglected garden is now the exception, whereas five years ago the reverse was the rule. Of course, the paving of the whole city has helped us very much, because when a boulevard is laid out and the pavement put down, the space in front of every house is exposed, and the necessity for putting that in grass has been to many

people their first lesson in gardening. The result is that on most of our streets you see a continuous lawn of fifteen to twenty feet deep, right along the street.

A Member of the Cobourg Horticultural Society: Three years ago, our Society adopted the plan of distributing seed to children with very satisfactory results indeed. We distributed early in the spring every choice aster seed, which we procured in New York, to all our schools, together with instructions to the teachers, asking them to tell the children how to plant. Then we offered prizes for the best specimens of flowers grown from this seed. These are exhibited in September, and I can assure you that no finer floral show can be seen anywhere, and Aster Day is a regular field day in our schools. We offer prizes in cash and hardier kinds of bulbs, and again give prizes for the best result obtained from these. I think that this is resulting in more practical work along the line of nature study, than perhaps any other scheme that has been devised. The Cobourg Society is very anxious to form a civic society for beautifying the town, and while we are succeeding to a considerable extent, I must say that the Agriculture and Arts Act under which societies operate is very much out of date, because it does not set before a society the best objects that may be obtained. It seems to me that societies spend too much on what may be called "prize-packages," and the object seems to be to give members about $5 worth of plants for a one dollar subscribtion. I think that the time has come to change that.

A. K. Goodman, Cayuga: I have here a letter, which I will read, from Mr. W. J. Neale, Principal of the De Cewsville Public School, in which he gives an account of how his pupils became interested in horticultural matters, and the good results attained:—

"In 1879, when I first entered Cayuga High School, I was struck with the general delapidation of things. It was anything but an ideal place for the culture of young minds. However, Mr. S. Keele, the new principal, undertook to improve everything, and with such good effect that now both the interior of the school and the grounds present an appearance pleasing, not only to the pupils and teachers, but to all interested in beautiful surroundings. Having witnessed this improvement in Cayuga, I determined, if possible, to put into practice the lessons that I learned there when I became engaged in a school of my own.

"In 1901 I became principal of the De Cewsville Public School; a fine looking building, with very spacious but poorly graded grounds. I soon found a chance to make attempts at improvement, and first decided to make a terrace between the school house and the road. I called a meeting of the ratepayers to discuss ways and means, but the meeting was poorly attended, although those present were very much in favor of my project. The trustees also gave me every encouragement. It then required very little effort on my part to enlist the sympathy and co-operation of the pupils, and we decided to have a bee in the autumn. Just three men came with teams, but we decided to do all we could and with the aid of the school boys we moved over fifty loads of dirt from a knoll behind the school to the space in front. Thus we were grading the front of the yard and levelling the back. In the spring of 1902, eight men with teams came to our aid and the terrace was finished and seeded."

"During the summer of 1902, we planted Geraniums, Coleus and Asters and after the grass came up it presented a very nice appearance. Every one who passed admired the improvement we had made, and when I asked for aid to grade a still larger space, all but two or three of our section willingly

came out. The grading was quickly done, and I have surrounded the graded part on two sides with forty spruce trees. These two graded spaces constitute our flower garden.

"In addition to the help given me, some fourteen in the section became members of the Cayuga Horticultural Society, and they kindly gave me the bonus allowed to be used in ornamenting the school grounds. We also hold an annual school concert, and the receipts are devoted to the same purpose.

"There is still room for improvement in our grounds here, but the start has been made, and no doubt the work will be thoroughly finished before given up. This fall we are having a hot-bed built and next spring we shall grow our own plants and have set aside five dollars to be awarded in prizes to the four pupils who can, from the plants furnished them in May, produce the finest display of flowers in September. We intend having a Flower Day, and all the plants will be placed on exhibit and the prizes awarded.

"In conclusion I may say that the only objection I heard raised to our work was that the pupils in their games would destroy the plants, but I have found on the contrary, that they are very proud and very careful of them, and they take special pleasure in caring for the plants and keeping the lawn nicely mown."

HORTICULTURAL SOCIETIES; WHAT THEY ARE DOING.

Edward Tyrrell, President Toronto Horticultural Society: I am pleased to be able to state that our gathering this year is to be laid partly at the doors of the Toronto Horticultural Society, of which I have the honor to be President. In conversation with Mr. Creelman last year, who was then Secretary of the Fruit Growers' Association, I mentioned how difficult it was to get a suitable place in which to hold our Chrysanthemum Show. He suggested co-operation with the Fruit Growers' Association, and the final result was the Fruit, Flower, and Honey Show which is now being held in this city. Our society makes no distribution of seeds or plants. We hold a monthly show in St. George's Hall, where plants according to season, are exhibited. Judges score the plants and give ten cents for every point. Some get as high as twenty points, others, perhaps, not more than five, but all get a share according to their merits, and the system has proved very successful. We find it more difficult to maintain a Horticultural Society in a city than it is in a town. One might naturally suppose that in a city the size of Toronto we should have thousands of members, but we find that people are so engaged and engrossed in other things that it is difficult to get them to take an interest. Nevertheless, our Society is progressing very satisfactorily.

R. B. Whyte, Ottawa: I quite agree with Mr. Macoun. Both thing particular in the way of civic improvement; our work has taken a different line. We consider that the strong point in our Society is the monthly meeting. We have monthly meetings for six months of the year, at which prizes are given and lectures delivered. We issue a prize list in advance, in which is stated the awards and the subjects of the lectures. We have also issued bulletins on bulb growing and other subjects, which are distributed free to our members. They have been much appreciated and we consider it well spent money. We also think it wise to distribute to our members the plants recommended for that purpose every year, and in this way to introduce them. They are not necessarily all new varieties, but they are all plants worthy of being grown for the house and garden.

We find it necessary to offer some inducement to many of our people, and we consider it well spent money. We offer a good three dollars' worth, and we have special facilities for buying cheaply, as we buy in large quantities. Consequently we have a membership of 246, which is a very fair number. Every member we get over the number necessary to secure our grant, which is 117, is a bill of expense to us. If the grants were made on the basis of the work done, we could easily have five hundred members. We distribute about $300 worth of plants, hire a hall every month for six months, and print bulletins and circulars. This year we had a balance of only $28, but consider that we get value for the money expended, and have every reason to feel encouraged at the result of the work. We are now in our fourteenth year, and are stronger and better than we ever were. Our prizes are not over one dollar as a rule, and we have a great many members who are sincere and earnest, quite independent of the prize money.

We advocate very strongly monthly competitive exhibits with money prizes. As a result of it the standard for fruit, flowers, and vegetables in Ottawa is very much higher than that of outside societies. We had nearly nine hundred entries at our shows this year.

D. M. Clew, President, Deseronto Horticultural Society: In our Society we found that the old scheme of having the directors choose the plants to be distributed to our members, caused considerable dissatisfaction. Some wanted plants, others seeds and others bulbs, and it seemed that we could not suit them. We therefore evolved a system which I do not think has been adopted by any other society. We allowed each member to choose anything out of the given catalogue up to a certain amount, supplying each with a blank order form, so that they could order what was desired, direct. We hold a successful flower show every year, and have succeeded not only in interesting our members, but in improving the town. This year we are offering prizes for the best kept grounds, which has added very much to the interest taken in the work being done in the town, and I think is a department which should be taken up by other Societies, in addition to the growing of plants and flowers and the teaching of the children.

A Member of the Guelph Horticultural Society: We have followed practically the same lines as the Hamilton and Ottawa Societies in the distribution of plants to children. Last year we distributed about 400 hydrangeas to the school children, and this year about the same number of packages of aster seed. We secure the co-operation of the teachers. When it comes to the exhibition of flowers and the distribution of prizes, each teacher is there with his pupils, so that there is no trouble or disturbance. This year nearly every child who took home seed made an entry. In addition to the seed, we distributed a pamphlet of two pages prepared by Mr. Hunt, of the College Horticultural department, dealing with the culture of the aster. We have distributed altogether four bulletins to our members, among them one published by the Ottawa Society. To the members of our Society we distribute bulbs and plants, and the members in nearly every case take a deep interest in them. We hold eight meetings in the year. This year we had addresses from four outside men, the other four meetings being addressed by local men. I think that especially among the children our work is proving very beneficial.

W. M. Robson, Lindley Horticultural Society: The first Horticultural Society in Lindsay, was organized about the year 1869. The membership was not very large, and interest gradually subsided until the society went out of existence. After an interval of a few years, the Horti-

cultural Society was resuscitated. During this lapse of time, the public had become better acquainted with the advantages and benefits of such an organization. Then a new feature was introduced—that of midsummer fruit and flower exhibitions, with addresses in the evenings. This proved successful for a few years till jealousy crept in amongst a few exhibitors, who thought the judges acted with partiality. This feeling spread, resulting in a gradual loss of members and brought about the collapse of society number two. Again, after a few inactive years had passed, the Society was re-organized and affiliated with the Ontario Fruit Growers' Association, which gave the Society greater advantages to offer to the public in the distribution of plants, etc. This had the desired effect, and in the third year we had one hundred members enrolled, system and order established, regular board meetings, and an occasional open meeting during the winter months. Such meetings were productive of much good to the Society, by sustaining and increasing our membership. Toward spring we looked forward with pleasant anticipation to the coming of the Fruit Growers' lecturer, and thus ran our yearly routine of work.

Our present Society was inaugurated in 1891, with a minimum membership of 50, which number soon rose to 100, our maximum being 132, and during nearly fourteen years our average membership has been nearly one hundred. We annually spend in bulbs, plants, shrubs or trees for premiums to the members, between sixty and seventy dollars. The directors think they can hold the membership and interest them more by the practical cultivation of these premiums than in any other way. Mr. Thos. Beall and myself have been members during the existence of all the societies, and I may add that, of the fourteen years of the present society, I have had the honor of presiding over seven of them.

THE AGRICULTURAL AND ARTS ACT; HOW IT AFFECTS HORTICULTURAL SOCIETIES.

By H. B. Cowan, Toronto.

Under the Act, grants are made to the agricultural and horticultural societies of the Province according to hard and fast regulations which do not take into account the work the societies are doing. The grants made by the Department of Agriculture to societies amount each year to about $80,000. If the agricultural societies were spending their funds to as good advantage as the horticultural societies are theirs, there would be little need for a change in the act. The yearly grants to horticultural societies amount to about $6,000.

Three serious defects in the act were pointed out. One is that district societies, by the act, receive much larger grants than township societies, although there are a considerable number of township societies which hold better agricultural exhibitions than many district societies. A second defect is that some societies, which receive large grants, do not expend nearly as much for the cause of agriculture as other societies receiving much smaller grants. Many societies are doing almost more harm than good as they conduct horse races, which are strictly against the law; allow gambling devices to be operated on the fair grounds (which is also against the law) and in some cases even permit liquor to be sold.

A third defect lies in the fact that where a horticultural society is established, its grant is deducted from the grants of the agricultural societies in that district. The result is that agricultural societies oppose the organization of horticultural societies in their districts. There are a number of sections in the province where horticultural societies are needed, but where it has been found impossible to organize them on account of the opposition of the agricultural societies.

A good suggestion would be that the horticultural societies should form a provincial horticultural association similar to the Ontario Association of Fairs and Exhibitions, which represents the agricultural societies. Such an association could hold an annual meeting for the discussion of horticultural matters, issue an annual report, arrange for the sending of speakers to the meetings of local societies and in other ways increase the enthusiasm of horticultural workers and add generally to the value of horticultural societies.

Views of the Delegates.

An animated discussion took place on the conclusion of Supt. Cowan's remarks. The views expressed were in part as follows:

A. Gilchrist, Toronto Junction: I think that Mr. Cowan's suggetion to form a provincial association is in the right direction. There is ample scope for such an organization. Many of our horticultural societies are not working on any definite plan and might do much better work. In many of the smaller towns and villages no horticultural societies exist. It is in such places that they are most needed. The requirement of the act, that the membership shall be at least 50, precludes their formation. Some change should be made in the act in this respect and horticultural societies should be made distinct from agricultural societies as regards their grant.

Alex McNeill, Chief, Fruit Division, Ottawa: There is no doubt we are all agreed that the funds for agricultural society purposes are in many cases scandalously wasted, and something must be done, if we are to avoid a great scandal in the administration of the agricultural affairs of this province. Instead of being schools of virtue, many of our fairs are schools of vice. I agree with Mr. Cowan that we need to make a very strong move in favor of better horticultural instruction. As to how that is to be brought about, we may perhaps differ. It seems to me, that simply to form another society does not solve the problem. Horticulture is just as much the object of the Fruit Growers' Association as the growing of fruit. The trouble is that the horticulturists have not forced themselves on the attention of the public to the extent necessary to get their due share of interest and attention. I believe that the best way to secure the ends we have in view is to retain the present organization rather than to form another society, involving a new set of officers. Let us have a fruit section, a horticultural section, a forestry section, with the same set of officers, office expenses, etc. There is no reason why the one society should not cover all this work.

Favored an Association.

Major H. J. Snelgrove, Cobourg: I desire to express the satisfaction of our society at the very excellent service which our superintendent is rendering us in his oversight of our work. We have received new inspiration from him since he occupied the office. I am glad that a move is being made to establish a Provincial Horticultural Society which will form an alliance with the local horticultural societies. The act under which

we work has been on the Statute book for 30 years, and it is high time that it should be made to represent the present day requirements of horticultural societies. We are performing a work which is entirely distinct from the professional side of horticulture. The fruit growers look at the commercial side, and while they are indirectly serving the community, they are first and foremost serving themselves and filling their own pockets. We are working for the good of the public, for municipal betterment and for the beautifying of our homes and surroundings.

There is one strong reason why the Act should be amended: The clause providing for the organization of horticultural societies stipulates that the money a society receives as a government grant, shall be expended only on lectures, exhibitions and the distribution of plants, tc. This is altogether too narrow a limitation. It prevents a society from doing anything for municipal betterment—towards the improvement of the parks and public playgrounds of the towns.

I should like to take issue with Mr. McNeill, who claims that we should retain the present organization. I had the honor to be a director of the Fruit Growers' Association and know something of its workings. While fully 80 per cent of its members are members of horticultural societies, the fact remains that only one or two of its directors are interested in horticulture out of some 15 or 16 officers and directors. I am prepared to move that we proceed to organize a Provincial Horticultural Association.

R. B. Whyte, Ottawa: I agree with Mr. McNeill as to the undesirability of multiplying organizations. I have always thought that the horticultural element was fairly well represented on the directorate of the Fruit Growers' Association. They have always had four to six directors. I agree that horticultural societies should be entirely divorced from agricultural societies. They have very little in common, and I think it tends to prevent their formation in some districts, as Mr. Cowan pointed out. Our grants should be made independent of the agricultural societies and should be divided partly according to membership, but more in proportion to the work done.

For the last three years the Fruit Growers' Association has held separate meetings in the interest of horticulture. I think there might be a special committee appointed by the horticultural societies to look after that department and send delegates to the annual convention. I think that the department should pay the expense of one delegate from each hundred members. In that way you would get all the advantage of a separate organization.

Mr. Rutherford, Hamilton: It appears to be that all that is necessary, is for us to remain as we are and have the Act amended. If it is any object, let the horticultural societies have a meeting like this every year and exchange views. If there is any idea of forming such an association as has been suggested, I think that the better way to go about it would be to appoint a committee of representative men to outline the duties and objects and to state in what way it would be superior to our present organization.

Mr. McClew: I have pleasure in seconding Mr. Snelgrove's motion that we form a horticultural association. While we have no ill-feeling towards agricultural societies or towards the Fruit Growers' Association, yet our objects are entirely different from either of them. We have no commercial interests. Our object is purely the advancement of the knowledge of plants for beautifying the homes. By forming a provincial association we should be in a much better position to help both the agriculturists and

the fruit growers. There always seems to be a feeling of jealousy between them, that the one society is taking from the other, which should not be. I do not think that a provincial association would cost the province a great deal. I am pleased to see that The Canadian Horticulturist is improving as regards horticultural matters, and no doubt still more space will be devoted to them in the future.

W. L. Stevens, Orillia: As to the formation of a provincial association, there is a good deal to be said on both sides. There is a great deal of opposition among horticulturists in different parts of the country to the Fruit Growers' Association.

J. G. Jackson, Port Hope: I called a meeting of our directors recently and obtained their views on this matter. In the first place, there seems to be some dissatisfaction existing in our membership in regard to the affiliation of the Horticultural Societies with the Fruit Growers' Association. They have thought for some time past that the fruit growers were getting the best end of the horn in The Horticulturist. I assume it was established for their special benefit. However, I frankly admit that it has improved very much recently in this respect.

A Committee Appointed.

After considerable discussion, Major Snelgrove withdrew his motion and moved, instead, that a committee composed of Messrs. H. R. Frankland, R. B. Whyte, H. B. Cowan, J. G. Jackson, Alex. McNeill, D. McClew and the mover be appointed to consider the advisability of forming a provincial horticultural association and also the proposal to amend the Agricultural and Arts Act as it relates to horticultural societies, the committee to report as soon as possible.

An amendment was moved by Mr. McNeill, that the Agricultural and Arts Act be so amended as to make horticultural societies independent of agricultural societies, that grants to societies be distributed in proportion to the work done and that a distinct horticultural committee be appointed to direct the executive of the Fruit Growers' Association in connection with horitcultural matters. The amendment was put to the meeting and was lost after which the main motion was carried.

An Important Resolution.

At the afternoon session of the convention Major Snelgrove, as chairman of the special committee, presented the following report which was carried unanimously:

"That your committee is of the opinion that the Agriculture and Arts Act should be amended because it permits of an unjust distribution of the government grant and that it in many districts works to the disadvantage of horticultural societies. We would, therefore, recommend that this committee be deputed to wait on the Hon. John Dryden, Minister of Agriculture, to urge that the Agricultural and Arts Act be completely revised and that the horticultural societies be placed on a footing of their own, separate and distinct in every way from township and district agricultural societies. We feel that such a step will greatly increase the usefulness of our horticultural societies, more especially along the line of civic improvement.

"In this connection we would further recommend that the superintendent of agricultural societies be instructed to arrange for a special meeting of this committee to consider a basis on which future grants to horticultural

societies should be made, and that this committee have power to add to its numbers.

"We are further of the opinion that the formation of a Provincial Horticultural Association is desirable in the best interests of our horticultural societies, but as any change in the Agricultural and Arts Act may affect a move of this kind we would recommend that this matter be left over for further consideration by the special committee already named and that the committee be instructed to report definitely at the next annual meeting of the Ontario Fruit Growers' Association."

Waited on the Minister.

On the following day all the members of the committee waited on the Hon. John Dryden, Minister of Agriculture, and, on behalf of the horticultural societies, laid the matter fully before him. The committee received a favorable reception, sympathy being expressed with the objects of the deputation. The minister approved of the proposal that the committee should meet to consider amendments to the Act and announced that he would be pleased to consider any further suggestions the committee might decide to make.

BEST ANNUALS AND PERENNIALS FOR CUT FLOWERS.

By Roderick Cameron, Niagara Falls South.

When we ask what is a good cut flower for table decoration, etc., there are two main points to be considered: First, stem; second, substance or durability. For vases it is imperative that flowers have a good stem. There are many excellent flowers, but owing to the shortness of their stems they are unfit for table decoration, except perhaps to the commercial florist.

Some of the most beautiful flowers in the garden are ephemeral, and would be a total disappointment as cut flowers; others again as the heliotrope, lack stamina, and would not keep in water but for a very short time. The hollyhock is an excellent example of substance, but the whole plant has to be cut. The salpiglossis has a good stem, but lacks durability.

Bearing the points of adaptability in mind, there are other secondary considerations, including the one of color. As there are no two persons whose tastes are exactly alike, this is a most touchy subject; one person just revelling in a certain color, while another thinks "it's just horrid." There is a good deal of error and misconception regarding colors and the harmonizing of the same, which ought to be dealt with from a scientific as well as from the æsthetic point of view. Then again there are plenty of flowers with good stems, good substance and good colors, such as the zinnia, that are so stiff and lacking grace they cannot be called good cut flowers. Such flowers, except in the hands of an artist, would only tend towards the stiff, formal and mathematically exact bouquets of years ago, which looked as if they were formed in a mould. We will not err if we follow nature closely, whether in the growing of our floral pets, the grouping together of our collections, or the making up of a bouquet of nature's choicest gems.

It cannot be too widely made known that there is a wealth of decorative floral beauty to be secured by utilizing a judicious selection of hardy perennials. The growing popularity and increased usefulness of hardy perennials is sufficient evidence of their value, if any is needed. Very little care is re-

quired with perennials after they are planted, other than keeping them free from weeds and the dividing of the roots when they become too large. The offsets may be planted in other desirable spots or given to friends.

Some Good Annuals.

The choice of the professional florist in annuals is limited. The Aster is probably entitled to first place, because they are produced in any desired color, on long stems, and they can be used with their own foilage. If seeds are sown from time to time during the summer the blooms can be had up to the time of hard frost. They are used for all purposes on account of their various colors and lasting qualities. The aster carries as many desirable points for cutting purposes as any other flower in the garden.

The next choice would probably be Mignonette, principally on account of the odor of the flowers, and their adaptability for all purposes. The Sweet Peas would likely come next, and for the same reasons as the Mignonette. *Centaureas*, or Sweet Sultans, are beautiful, large, and sweet scented flowers that should be more grown. They are produced freely on long stems, are very easily grown, and their lasting qualities make them ideal for cutting. Their height is two or three feet.

The Ten-week Stocks are probably more grown than any other annual. No plant of its size will produce more bloom or is better suited for cutting for the border. They are extensively grown by the commercial men for cutting during the winter. Sweet Scabiosa, or Morning Bride, of late years, have been very much improved in size and in the colour of their blooms. The stems are ideal entitling these plants to rank among the first on our list as cut flowers. They are produced in all colours, and grow to about three feet in height. The hardines and very free blooming qualities of the Candytuft, even when sown in the open border, claim for it a first place among annuals. The flowers are produced in several colours, the plants being nine inches to a foot high, good to cut, and suitable for the front row in the border.

Celosia plumorus, Plumed Cockscomb, has been much improved lately and those wishing colour can obtain it in these beautiful plants. They are choice objects when planted in a small round bed in mixed colours or used as a line in a ribbon border. They are grand to cut for autumn colouring effects when used with the coloured leaves of other plants. They can also be used as dried flowers and can be had in almost any shade of colour. The plants are one to two feet high. *Rudbeckia Tricolour Superba* is an annual that has taken a prominent place of late as a cut flower. Its growth is very simple and the plants are worthy of a place in any garden.

The annual Gaillardias are among the most charming flowers to cut and for the border on account of the long duration of their blooming, which lasts from early summer until they are cut down by hard frost. They stand wind and rain better than any other flower we are acquainted with. Their quick growth and hardy nature commend them to all lovers of flowers.

There is no annual flower more popular than Nasturtiums. They are a magnificent class which presents all the richest and most varied shades found in flowers. The blooms are mostly used for table decorations. The taller varieties cannot be surpassed as a trellis covering, and the dwarf varieties are to be found in every window box and hanging basket. If long lengths are cut from the taller ones in the fall and placed in a glass celery dish full of water, they will root in the parlor window and be a thing of

beauty during the winter. Even the roots, as seen through the glass, are very pretty.

The varieties I mention are the annuals I consider best for cut bloom. They are standard favorites which novelties have not been able to drive from the field.

HARDY VINES FOR THE HOUSE AND GARDEN.

By W. T. Macoun, Horticulturist, Central Experimental Farm, Ottawa.

Vines or climbing plants play an important part in the decoration of our homes. The vine is about the easiest plant to grow, especially around the home. You can plant it close to the house, and if it is properly planted and the right kind of a vine, there is nothing to prevent its going ahead and soon making a great improvement in the appearance of your dwelling. There are six reasons in favor of planting vines near the home: first, it is the easiest plant to establish; second, in a very short time it makes the home more attractive; third, by its means you can cover an unsightly place in a very short time; fourth, it makes the house cooler in summer; fifth, it affords shade; sixth, if judiciously planted, and you have a proper arrangement of varieties, you can have bloom from early in the summer until it freezes up.

In order to properly plant vines, it is necessary to know how they climb, as they require different kinds of support. There is a class which climb by twining their stems around posts, such as the Climbing Bitter-sweet. This vine makes a tremendous growth in summer. Vines of the Clematis type climb by means of the petioles of the leaves. Another class, such as the grape, climb by tendrils; another class, such as Boston Ivy, by means of little discs on the tendrils. Another advantage of the climbers is that they will grow in soil in which some plants will not succeed; but the best success will be obtained from good soil. Difficulty sometimes arises in growing vines successfully where a lot of brick, stone, mortar and other rubbish has been dumped near the house during building operations. This must be removed before planting.

The first requisite in a vine is good foliage; second, attractive bloom; third, freedom from insect pests. Some vines are very much troubled with insects and this is a great objection to those varieties.

Foremost among the climbers which have the good points I have mentioned, are the varieties of Clematis, and for general purposes, I think they head the list. One of the easiest of these to get is Virgin's Bower (*Clematis Virginana*). The foliage is very attractive and I have never seen it seriously attacked by insects. It begins blooming in the latter part of July in the Ottawa district and continues for a number of days. If you have following that, the European species, Traveller's Joy (*Clematis Vitalba*), you can carry the blooming till the latter part of August. Then with the *Clematis Paniculata*, it may be continued till the end of September. Then there are the large-flowered sections of *Clematis, Clematis Jackmanni* and *Clematis Henrii*. These are more difficult to grow, but when once established, they will well repay the trouble.

Next in the list I would recommend plants of the honeysuckle class. They have fine flowers, good foliage, and are not troubled with insects. The Scarlet Trumpet honeysuckle will bloom all summer on account of flowers coming on the new growth, if one keeps the vine growing thriftily. The

English Honeysuckle is another desirable variety, but it stops blooming in a short time. The flower buds of this variety will be killed in winter unless it is protected. A variety that is largely grown in Western Ontario and in the States is the Japanese Honeysuckle. This is quite attractive, has a yellowish flower and blooms in great profusion for a long period. It is not hardy in Eastern Ontario, and I would not advise it where the temperature falls to 20 degrees below zero.

Next on my list comes the climbing roses. Some would put these at the top, but they have one or two objections. First, they are very much troubled with insects, and require much attention; second, their foliage is not always attractive. If one can grow them in combination with something else, or place them so that their foliage will not be prominent, they can be grown to good effect. I think the best place is at the side of a house or a little way from the front entrance; you get the effect of the bloom better in that way, and when the foliage begins to fall it is not so noticeable. The very best of the roses is Crimson Rambler. A gentleman in Ottawa assured me that he had ten thousand blossoms on one bush recently. He prunes it so as to leave only two or three strong canes, which he can handle very easily. These he takes down and bends along the ground, placing a box over them and filling it with leaves.

There are three other varieties in this class which are very good indeed, the Dawson, the Ruby Queen, and the Philadelphia.

Another successful climber is the Chinese Matrimony Vine (*Lycium Chinese*). This vine, while not the best for growing near a house, is very useful in covering rocks, old stumps, etc., as it is of a pendulous nature. In the autumn it is covered with scarlet berries.

There is a native climber which we should have at every home, but which is scarcely seen at all, called Climbing Fumitory (*Adlumia Cirrhosa*). It is a biennial. The new plants of this year are ready for climbing next year. It is very graceful, and the foliage and flowers are very attractive.

There are a few others which have attractive flowers, but I have not been much interested in them as they are not hardy with us. They are the Wistaria and the Trumpet Vine. Where these are grown, they are very satisfactory.

Where there are large verandas and summer houses, the Dutchman's Pipe is one of the finest to grow. Its leaves are large and heavy looking, and it looks well in large masses.

There are two or three perennial climbers which have attractive foliage but do not have showy flowers. The first of these is Boston Ivy, which is well known in this locality. Then there is the Virginia Creeper. This is unfortunately troubled a good deal with thrip, an insect which sucks the juice out of the leaves, and during the latter part of the season causes the withering of the foliage. We have a local variety in Ottawa, which we have called the self-fastening Virginia Creeper. It has discs on the tendrils and will climb a wooden or brick wall practically as well as Boston Ivy. It has downy leaves. I do not know whether this makes it uncomfortable for the thrip or not, but we have not nearly as much trouble with the pest on this variety. This variety is now being propagated by many of the nurserymen.

Another vine which I consider one of the most desirable to plant, is the Climbing Bitter-Sweet (*Celastrus Scandens*), which is a native plant. Its foliage is bright green and it makes great growth, and is never troubled with insects. The fruit is also attractive. It is suitable for fences or verandahs. The Japanese Climbing Bitter-Sweet (*Celastrus Articulata*) is even more attractive, as there is a great contrast in the colour of the fruit vessels.

There are a few annual climbers, or climbers which have to be treated as annuals, which I will give in the following order: 1, Sweet Pea; 2, Nasturtium; 3, Scarlet Runner; 4, Morning Glory; 5, Canary Bird Vine; 6, Maderia Vine; 7, Varigated Japanese Hop; 8, Cinnamon Vine.

I would not think of planting Morning Glory and Scarlet Runner in front of the house, which is frequently done on account of their showy character. They are distinctly back yard plants and it is far better to use something like Clematis or Honeysuckle in the front, where it will be seen by the public.

Prof. HUTT: Do you find Dutchman's Pipe hardy?

Mr. MACOUN: Yes; but it takes three or four years to get established.

A Member: My objection to vines near a house is that they form a nesting place for sparrows and are very dirty and noisy on that account?

Mr. MACOUN: After the vines are established, they may be cut down each year within two or three feet of the ground. They will grow up and cover the veranda, but will not have sufficient strength to give support to birds' nests.

WHAT MAY BE GROWN IN A SMALL GARDEN DURING ONE SEASON.

By R. B. WHYTE, Ottawa.

By the term garden, I mean not merely a place for the growing of flowers, but a general-purpose garden. Such a garden should contain a good collection of such fruits as can be grown in the locality and the size of the garden will permit, enough of all the common vegetables to supply the early demand, and sufficient flowers to ornament the garden from April to October, sufficient cut flowers to decorate your house and give to all your friends who appreciate them. My own garden contains about seven-sixteenths of an acre. On this we grow eight or nine barrels of apples a year, large quantities of all the small fruits, all the common vegetables except potatoes, with a very large collection of ornamental plants. It does not pay to grow potatoes in a garden of that size.

In the flower department, to have continuity of bloom we must have spring and summer bulbs, bedding plants, as geraniums and begonias, and the ordinary annuals, perennials and climbers.

There has been a great deal of discussion as to the relative advantages of annuals and perennials for bloom. I grow perennials largely, but for mass and a continuity of bloom, we have to depend on the annuals. With five varieties of annuals, such as Phlox, Sweet Pea, Poppy, Eschscholtzia and Candytuft, you can obtain a greater amount of bloom on a given space than you could get from any twenty varieties of perennials.

For early flowers the Dutch bulbs are indispensable. The April flowers are all bulbs; the May flowers are nearly all bulbs, with a few early perennials. The dainty Snowdrop and Scilla, and gorgeous Tulip, the fragrant Hyacinth, and the graceful Narcissus, make these not the least attractive months of the garden season. June, the great flower month—the month of Roses, Paeonies, Iris, Lilies, and many other attractive perennials,—ushers in the early annuals, and the garden is in its best attire. (Lists are appended of the flowers in my garden during these three months of the present year.)

In describing what may be grown on half an acre of ground, I shall have to take you to my garden as an illustration, and show you not what may be grown, but what was actually grown during last season.

In vegetables, we grew all that a large family required of lettuce, radish, asparagus, peas, beans, beets, carrots, corn, and tomatoes. In corn we grew Golden Bantam, a new variety which has the finest flavor of any corn I ever tested. In tomatoes we grew Dwarf Stone and Champion, both very desirable varieties for small gardens, as they occupy very little space.

In fruits, you may be surprised to learn that we did not grow the strawberry because it takes too much room, as it is necessary to leave bare ground sufficient for a new patch every year, and more time to attend to it than I can afford; but instead, we had a great variety of plums, cherries, apples, grapes, 34 varieties of raspberries, currants, 20 varieties, gooseberries, 32 varieties bearing,—not the small American gooseberry, but the large European sorts, when ripe one of the most delicious fruits grown.

Grapes take up too much room in a small garden to grow in the ordinary way. We grow them over a path, and in that way economize space and have a shady avenue forty or fifty feet long, which is one of the most delightful features of the garden. Possibly we do not get as much fruit in that way, but we get a great deal of foliage, which is a very attractive feature.

The greater part of the garden is devoted to the growing of flowers. We grow all the early bulbs. Of Narcissus we have seventy varieties. Some Narcussus will not grow here, and we have discarded thirty or forty varieties because they are not continuous, dying out after the first year's blooming. We have a large collection of tulips, about 150 varieties: hyacinths, 25 varieties; Paeonias, 40 varieties; Phlox, 60 varieties, Spiroea, 12 varieties; German Iris, 50 varieties; Japanese Iris, 35 varieties; Montbretias, 15 varieties; Tigridias, 10 varieties; Hemerocallis, 16 varieties; Cannas, 15 varieties; Lilies, 15 varieties; Aquilegias, 8 varieties; Troillius, 8 varieties; Oriental Poppies, 20 clumbs; and eighty other varieties of perennials, and a few roses. A collection of 5,000 Gladiolus adds much to the color show. We have all the common annuals, such as Sweet Pea, 40 varieties; Asters, 12 varieties; a large collection of Poppies, Zinnia, Scabiosa, Phlox, Petunias, Pansies, Eschscholtzia, Sweet Alyssum, Verbenas, Candytuft, etc.

Very few Canadian houses keep a good collection of German Iris, and you have to go abroad for them. I would advise no one to undertake to grow roses unless willing to give a great deal of time to them; they are so subject to vermin and disease that constant vigilance is the price of success.

The Shirley poppy is the plant of all others that gives the greatest return in color and beauty. The seed is hardy, and if you are careful not to let any inferior flowers go to seed, they will improve every year. I have selected them for the last eight or ten years. Every season I go over them and mark every flower with a string ticket, on which I write the color. When they begin to go to seed, I pull up every plant that has no tag on, and in that way no plant that is not wanted is allowed to go to seed. As a result, I have the finest collection in the country. Out of ten prizes at Ottawa, I took nine firsts and one second. By carefully selecting the seed you can improve every annual. Poppies should be carefully thinned: they should never have less than eight inches, and they are all the better if they have twelve. The California Poppy, or Eschscholtzia, is one of the most

desirable annuals from the fact that it blooms from June till it is frozen. In Petunias, some fine varieties have come in of recent years.

The great problem in a flower garden is to have continuity of bloom. If you depend entirely on bulbs, you will have a great show in April and May, and bare ground for the rest of the year. You must so arrange your plants as to have a continuous succession throughout the season. Our plan, in order to secure this, is to plant tulips and narcissus along the borders of the path. I do not attempt to make beds of them, but grow them in clumps. They run about 24 inches back from the edge of the border, and I endeavour to break the color by planting bright colored tulips with narcissus between. This prevents a clashing of colors. At the back of this row there is a double row of Lilies; back of that are Paeonies, and back of that Phlox. While the bulbs are growing, poppies are coming up among the bulbs, That occupies the ground until the middle of July, at which time we pull out all that we do not want to seed. By the time the Lilies are over, I have my seedling annuals ready to transplant to take their place, and a continuous succession of bloom is kept up from end of April till October.

Good paths are very desirable in a garden. Loose material in which the foot sinks is very disagreeable. The path should be hard, dry and clean, and wide enough for two people to walk abreast. The border is an important feature; boards are not admissible for this purpose, and a grass border entails a great deal of work. I find that the best of all is a boulder boarder. The boulders should be about six inches long, three inches wide, and four or five inches deep. These are sunk in the ground and will remain as long as the garden is in existence. They are never displaced, and are always tidy and neat. In making a path, I take out the whole surface for fifteen inches deep and fill in with unsifted coal ashes to within two inches of the surface, roll hard, and spread over it one and a half inches of sandy soil, to prevent clinkers coming to the surface. This makes a pleasant path to walk on, and it is dry even after the heaviest rains, is cheap to construct, and easily kept clean.

Another feature, which I think is very desirable, is to have resting places in the garden. We have summer houses at every convenient place. It is a very fine thing to be able to sit down and enjoy your garden. These summer houses are covered with grape vines, climbing roses, or some other climber.

List of Varieties.

April Flowers:

Snowdrops.
Bulbicodum vernum.
Crocus.
Scilla Siberica.
Scilla Siberica alba.
Scilla bifolia.
Chionodoxa Lucillae.
Chionodoxa Sarniensis.
Chionodoxa gigantea.
Erythronium Dens-canis.
Early Narcissus.
Early Tulips.
Early Hyancinths.
Viola tricolor.

May Flowers:

Grape Hyacinths B. & W.
Fritillaria Meleagris.
Fritillaria imperialis.
Fritillaria Pallidiflora.
Doronicum Caucasicum.
Doronicum Plantigineum.
Dicentra Formosa.
Dicentra spectabile.
Epimedium rubra.
Epimedium flavium.
Arabis alpina.
Primula Harry Mitchell.
Triteleia uniflora.
Spinar arguta.

List of Varieties.—Continued

May Flowers—Continued:

Lily of the Valley.
Iceland Poppy.
Trollius.
Forget-me-not.
All Tulips.
All Narcissus.
All Hyacinths.
Echioides Arnebia.
Pansies.
Aquilegias.
Phlox subulata.
Phlox divaricata.
Scilla campanulata alba.
Scilla campanulata coerulea.
Scilla campanulata rosea.
Anemone fulgens.
Hemerocallis flava.
Hemerocallis minor.
Hemerocallis Rutilans.
Iris pumila.
Iris Florentina.
Iris cristata.
Iris Queen of May.
Adjuga Genevensis.
Camassia esculenta.
Lupinus polyphyllus.
Geum maximum.

June Flowers:

Iris.
Paeonies.
Roses.
Petunias.
Papaver orientale.
Papaver bracteatum.
Verbascum Phoenicium.
Polemonium Richardsoni.
Anthericum Liliastrum.
Phlox ovata.
Phlox pilosa.
Hemerocallis Dumortieri.
Hemerocallis Thunbergi.
Hemerocallis Apricot.
Hemerocallis Sovereign.
Hemerocallis Midden dorphiana.
Incarvillea Dilavayi.
Dianthus plumarius.
Hesperis matronalis.
Valeriana officinalis.
Dictamnus Fraxinella.
Digitalis grandiflora.
Spiraea Van Houte.
Spiraea Filipendula.
Spiraea Humbolti.
Spiraea macrophyllus.
Spiraea aureus plenus.
Phlox Drummondii.
Gladiolus Byzantinus.
Bellis perennis.
Geum coccinium.
Allium Moly.
Campanula glomerata.
Campanula persicaeolia.
Funkia ovata.
Sweet William.
Lilium tenuifolium.
Lilium Colchicum.
Lilium Croceum.
Lilium aurantiacum.
Lilium Tottenhami.
Lilium grandiflorum.
Lilium mulliflorum.
Lilium Martagon.
Lysimachia punctata.
Cannas.
Shirley poppies.
Shasta Daisy.
Sweet Peas.
Iris Hispanica.
Iris Anglica.
Canterbury Bells.
Achillea Pearl.
Delphiniums.
Geranium platypettalum.
Clematis integrifolia.
Phlox Defiance.
Phlox Linnet.
Potentillas.
Oenothera Youngi.
Dahlias.
Heliopsis Pitcheriana.

Q. What varieties of gooseberries do you recommend?

Mr. Whyte: We grow them for eating purposes, and have not had any experience with canning varieties. For the English varieties a heavy clay soil is necessary to prevent mildew. I do not think there is any finer

fruit than a thoroughly ripe gooseberry of the English variety. Most people think of gooseberries as the sour little things you see on the market. I do not grow those at all, but grow the gooseberry that is intended for eating raw.

Prof. HUTT: I have had the pleasure of visiting Mr. Whyte's garden and can testify that it is "A thing of beauty and a joy for ever." The marvel has been to me that one man, and that man an amateur engaged in business, can secure such results. I believe he has done more towards cultivating a love for the beautiful in gardens at Ottawa and other cities which he has visited and given addresses in, than any other man in Ontario, and I look upon him as a public benefactor. I do not agree with him in everything. I would not agree to leaving out the strawberry bed. I would cut down some of the gooseberries and plant a few strawberries somewhere. His garden is the most condensed experimental farm we have in the whole Province.

Q. Have you grown the Moyer grape?

Mr. WHYTE: I gave it up; it did not produce enough.

Q. We often see it recommended in agricultural papers; why is that? Why do our horticultural papers persist in telling the people it is a good variety when it is useless.

Mr. HUTT: I cannot agree to that statement. It may not be valuable for the Niagara sections, but it certainly is for the northerly sections of our Province where it will fruit very well. For southern sections we, of course, have many better varieties.

Mr. KYDD, Norfolk: I agree with Prof. Hutt. The Moyer is my earliest and best producing grape. It requires severe pruning, and is small, but the quality is good.

Mr. MCCLEW: It is not a grape that anyone can grow for commercial purposes, but it is a sure ripener in the north, and that is the kind we want. It is the earliest red grape we have.

Mr. HARVEY: I was secretary of the Horticultural Society in Hamilton for several years, and while there, I wrote a paper on the same topic as that as which Mr. Whyte has addressed us. I agree with Mr. Whyte in almost everything he says, but must say that I prefer perennials to annuals. I do not like the path he speaks of; I think a grass path is pleasanter.

THE CARE OF WINDOW PLANTS.

By WM. HUNT, ONTARIO AGRICULTURAL COLLEGE, GUELPH.

To be successful with window plants one must really love them, and not begrudge the time and attention they take. It is not usually those who exclaim the loudest, on seeing a display of plants and flowers, "Oh! how I love flowers!" who are the most successful in their culture.

The most successful window gardeners are those who take a quiet, observant pleasure in watching the gradual growth and development of the beautifully varied phases and features of plant life. Many persons only love flowers as decorative objects; oftentimes from a sense of vanity or frivolity. As a rule these people are not those who succeed best in the culture of plants and flowers. The true student of nature takes as great a pleasure in his plants when in a dormant or semi-dormant stage of comparatively uninteresting growth as when watching the flower buds develop into beautiful, richly colored flowers.

The Window.

For window plants in winter a window facing the south or southeast is preferable, especially for flowering plants, as this aspect gives a maximum of sunshine and avoids the cold west and northwest winds. Ferns, palms, and many foliage plants will succeed as well in a window facing the north or northeast as in a south window, but flowering plants will do better in a sunny position.

Avoid draughts of cold air on plants, as they are injurious, checking the growth, and often inducing attacks of mildew. If outside air is given plants in winter, and sometimes this is beneficial, give them ventilation on sunny, calm, and not excessively cold days. Draw the top sash of the window down an inch or two, or, if possible, induce ventilation from an adjoining room. Plants like fresh air but object strongly to being in a cold draught. A thick paper window blind, or sheets of newspaper between the window and plants, will protect them on extra cold nights.

Potting Soil.

Every one who attempts to grow window plants should have a small pile of prepared potting soil made from well rotted sod and thoroughly rotted stable or cow manure. The too common practice of using earth from the garden, or black soil from the bush, is oftentimes the cause of failure and disapppointment in plant growing. The earth from the garden is too often lacking in fertility and, what is of still more importance, is too often deficient in the fibry matter found in partially rotted sod. Good potting soil may be obtained from some tough sod from an old, well fed down, pasture field where the soil is of a loamy nature. This sod, before being used, should be stacked in the open, mixed with well rotted stable manure or cow manure and the pile be left to rot. Where this trouble is too great to be undertaken prepared potting soil may be obtained from a florist.

Pots and Potting.

Use unglazed plain flower pots for growing plants. For potting rooted cuttings or slips use small pots, a two and a half or three-inch pot being usually quite large enough for potting rooted slips. When the plants are fairly well rooted repot into a pot two sizes, or two inches larger. A change into a pot two sizes larger is usually sufficient. Over-potting, or repotting the plant into a pot four or five times larger, is a too common mistake with amateur flower growers, often resulting fatally to the plant.

Use a mixture of one part of fine sharp sand, and three parts of the potting soil for rooted cuttings. For re-potting larger plants one part of sand to six or seven parts of potting soil is about the proper proportion for most window plants. Even if common garden soil is used for potting soil, the sand will be beneficial. In potting or re-potting plants be sure that the hole in the bottom of the pot is open to allow of free drainage. About half an inch of coarse gravel, or coal cinders, etc., should be placed in the bottom of four or five inch pots to secure good drainage. In six or seven-inch pots, an inch in depth of this drainage would not be too much. Very small pots seldom require drainage.

Watering, Spraying, Fertilizers.

All freshly potted plants should be watered once as soon as potted. Give sufficient water to moisten all the soil in the pot. Do not give more

water until the soil shows signs of dryness. If the plant wilts a little, do not saturate the soil with water, but remove the plant to a shaded position for a few days. Too much water often kills newly potted plants, as there is no root action to absorb the excess of moisture.

Water growing plants when they require it. To find out when plants need water, watch the surface of the soil closely. When the rough uneven portions of the surface of the soil begin to have a light, greyish color, or when the top of the soil will crumble between the thumb and finger, the plant requires water. Give sufficient water to moisten the soil to the bottom. Plants should be watered only when the soil requires the moisture, which condition can only be learned by experience and observation. The diary or calendar is of no use as a guide in the watering of plants. One rule should always be borne in mind, viz.: That sufficient water should always be given growing plants to moisten, not saturate, all the soil in the pot. Light sprinklings of water that only penetrate through an inch or so of the soil are useless.

In winter use tepid or rain water at a temperature of about 65 degrees. In spite of assertions to the contrary I am satisfied that water of a temperature at or near freezing point is injurious to plant life in greenhouses, to say nothing of window plants.

Q. Do you use charcoal for drainage.?

Mr. Hunt: It is very good but somewhat expensive.

Q. What is the best soil for Azalias?

A. About fifty per cent. of good loamy bedding compost and fifty per cent. good peat. In order to procure good peat we have to send to New Jersey for it, as our people have not got into the habit of putting it up in commercial form.

Q. Cannot you obtain it in the woods?

A. Yes. Give Azalias plenty of drainage in the pot, and do not plant too deep in the soil.

Q. Do florists always use drainage?

A. Not in small pots, but they do in pots of five inches and over. Drainage is more necessary in window plants than in commercial florists' work.

Q. Do you find that water impregnated with lime is injurious to the Azalia?

A. Yes; anywhere near a limestone ridge is an objectionable locality.

Hon. Mr. Dryden, Chairman: Mr. Hunt has presented a very interesting topic. We must have an interest in a thing if we are going to undertake to manage it successfully. It is the same in handling live stock. It is what we are interested in and like that we do the best with. I am not a plant man, and am inclined to follow animal rather than plant life, but I have learned that the same principles hold good in breeding plants as in breeding animals.

THE RELATION OF BIRDS TO HORTICULTURE.

By C. W. Nash, Toronto.

I imagine that gentlemen engaged in horticulture had a very serious time of it last winter, as I notice that thousands of dollar's worth of trees were girdled and destroyed by mice. It perhaps seems a strange thing to say, but it is a fact nevertheless, that all that enormous loss was caused simply because we have overlooked the value of certain classes of birds. In or-

der that you may understand this statement, I will explain that the most important law in all nature is the one which maintains the balance between various forms of life in the animal and vegetable world. If that balance is by any means destroyed to the advantage of any one particular form of life, then the whole is more or less thrown out of gear, and generally speaking, it is our intelligent, brilliant selves who suffer.

The mice I refer to, undoubtedly have a certain function to play in the scheme of nature, but if they are permitted to increase to such an extent that they upset nature's arrangements, then somebody or something must suffer for it. In this case man upset the arrangements by destroying the animals specially created to keep these mice in check, namely the hawks and owls. These two forms of life are highly specialized for the purpose of keeping down the number of these little rodents, which are not really mice, but the short-tailed field Vole. It is more than twice the size of our common house mouse, and has a short, round head and a very short tail. It does not as a rule enter your house or barn, nor does it burrow in the ground, but it constructs its nest at the roots of rank herbage. From their nests they drive a net-work of runways in every direction along the sides of which they find their food. I have no doubt you have seen, when the snow was going off, how these runways ramified from a pile of old rails or some shelter of this sort. But when the herbage is high, you will not see the slightest sign of these creatures; yet the fields may be fairly alive with them. Our eyes are not sufficiently specialized to enable us to see them, but the hawks and owls are able to do so, and they feed upon them almost exclusively when they are abundant.

There are other creatures, such as foxes, weasels, and snakes, that feed upon these little creatures, but the principal agency in checking them is the birds I have mentioned. But we have taken it into our heads all over the country that hawks and owls make a specialty of destroying our poultry, and if a hawk happens to show itself around a barnyard, you will see all the people in the neighborhood running for their guns.

Nearly all the hawks we have are quite innocent of chicken killing. There are two kinds however that will do so: the Goshawk and the Sharp-shinned Hawk. The Goshawk is a large hawk with slate coloured plumage and black markings, and is mainly a winter bird with us. The Sharp Shinned Hawk is very much smaller. It breeds here in the summer. These will undoubtedly kill poultry. If they can find a brood of chickens they will probably get every one if not stopped, or if the hen is not game enough to protect them. The Goshawk is the more powerful, and can kill mature poultry, during winter time particularly; but I have never seen it in southern Ontario during the summer. These are the only two kinds of hawks that I have ever found guilty of destroying poultry in this country. Experts at Washington, who have investigated the contents of the stomachs of thousands of hawks support this assertion. The large slow flying hawks which are commonly charged with killing chickens are as a rule perfectly guiltless. When you see one of these hawks sailing about over a field, or floating slowly and, then sailing in a slow, lazy sort of fashion, and occasionally dropping down to the meadow you may be sure that it is of the harmless kind and should be rigidly protected.

Of the owls there is only one to which any suspicion can ever attach, and that is the Great Horned Owl or Cat Owl. All the others are strictly beneficial. Some of them will occasionally kill small birds, the Short-eared Owl in particular, but the rule is that they feed upon mice almost exclusively.

In regard to the Great Horned Owl, it will at times kill poultry, but it rarely visits farm buildings in warm weather; it is only in winter time that it is liable to leave the woods, and at that season of the year poultry should be where an owl cannot get at them, as otherwise there is no money in poultry. Mice are their proper prey, and they are marvellously specialized for the purpose of catching them. Did you ever notice an owl when hunting? It floats through the air so silently that not the rustle of a feather reaches the ear. It glides over the meadow and drops like a shot, and when it drops there is a mouse gone. Its eyes are so constructed as to see the tiniest object that has motion. Its ears are the most extraordinary perhaps to be found in any created being. At first sight it does not appear to have any ears, but push the feathers aside, and a large orifice is revealed, which is as big as the centre of your palm. This peculiarly constructed ear is very sensitive and is for the express purpose of permitting the bird to hear the slightest rustle of its prey. The Short-eared Owls are a little bigger than a pigeon, and will eat from eight to ten mice every night, and perhaps kill a great many more that they do not eat.

We have another smaller owl, the Screech Owl, which lives about our buildings, or would, if permitted to do so. It is particularly fond of orchards, and likes to take up its abode in an old apple tree. It is no bigger than your fist, but it is the most expert mouse catcher that the world ever produced. It catches mice for the pure love of hunting, as well as for its actual needs. If you examine a barn frequented by these owls during the winter, you will find in almost any hiding place a lot of dead mice stored away. What puzzles me in connection with the matter is that although the farmer must, one would think, notice the way the owls are living about his barns, yet he and his boys cannot resist the temptation of blowing them to pieces every chance they get. Only last winter within ten miles of this highly civilized and educated city of Toronto, I saw a dozen or more that had been brought into a taxidermist to be stuffed. It is just because we have interfered with the lives of these creatures.—because we have upset this balance of nature,—that by degrees the mice have accumulated upon us until they caused so many thousands of dollars damage last winter.

It is a law of nature that wherever a large accumulation takes place in any form of life, we nearly always find that it is followed by an increase in the creatures that prey upon it. In all probability we shall find that this winter there will be a great increase in the number of owls, if we will permit them to come and stay. This would only be an instance of history repeating itself. These plagues of field mice have occurred before, and the whole thing has been thoroughly investigated. The Earl of Minto sat upon a commission, before which the evidence of about seventy farmers and game-keepers was taken in Scotland. It was there proved that the mice had accumulated, because the game-keepers had shot off the hawks and owls. The game-keepers admitted this; they did it because their masters ordered them to. They did from interest what we do from ignorance. The penalty however is the same in each case. During the investigation the value of the Short-eared Owls as destroyers of mice was conclusively shown. The fact came out that not only did large numbers of these birds accumulate in the districts affected by the mice, but that they also changed their habits to a great extent. In Great Britain they had always been mere migrants, arriving late in the autumn and leaving again in the spring. But when the mice became abundant, these owls arrived in great numbers, and did not leave in the spring, as usual, but built their nests there; and whereas they usually averaged only four eggs for

a brood, they now averaged seven and eight, and kept on raising brood after brood so long as the mice plague lasted. The farmers did not shoot them, and so they remained in the infested district till they cleaned out the pest. This is precisely what they would do for us if we only had sense enough to let nature alone.

Before leaving this phase of the subject, I would urge upon all who are interested to prevent at all hazards the destruction of hawks and owls on your farms and in your neighborhood.

Let us take another department of the subject. I suppose it is superfluous for me to say to you that there is no part of a tree or plant which is not But perhaps you may not have noticed that while there is some form of pest fitted to the destruction of all plant life, yet there is another form of life equally adapted for keeping the pest in check. Among the most destructive forms of life that we have to deal with in connection with trees are borers. I suppose there is not a tree of any kind that is not more or less liable to attack from various species of borers. Some are very destructive, the worst being those larvæ which remain for two or three years feeding in the tree. Some years ago they were not nearly so numerous as they are to-day. The ravages of borers now, particularly in Western Ontario, are simply terrible, and they are increasing every year. More particularly is this so with our shade trees. At one time, the maple was considered quite a safe tree to grow, but it is now being destroyed continually, and I find that the maple borer is gradually extending its ravages eastward. All forms of insect life are represented by some borer or other. Some remain in the larvæ condition for two years or more, and where they live so long, you will understand that they can do much damage feeding on the cambium. After they have established themselves in the tree, they are about the most difficult thing to deal with that we can possibly have. It is true you may go over your trees with a piece of wire and try to jab the life out of the borers, but after one experience, you will come to the conclusion that man is not by nature adapted to hunt borers in that fashion. Nature never intended that man should do this work, and has provided a class of birds that are so admirably adapted for the purpose that it is hard to believe that anything better could be conceived. These birds are called woodpeckers. If you examine a woodpecker, you will find that its claws are hard and strong and peculiarly arranged. In other birds, the claws are arranged three in front and one at the back, but the woodpecker has two pointed forward and two back to enable it to balance as it clings to the bark of a tree. Their tail feathers are pointed and very stiff,—almost like whalebone. These they press against the trunk and so obtain leverage to strike a heavy blow to cut into the burrow of the borer. Their beaks are hard, sharp and chisel like. Perhaps their most extraordinary organ is the tongue. All birds that feed on borers and dig them out for themselves have a very long tongue, extending in some cases from three and a half to four inches beyond the end of the beak. It is round, very sharp at the point and barbed at each side. It is curious to observe how it is coiled away. In some species it goes back over the top of the head, comes down and around and coils under the eye. When a woodpecker is working over a tree for borers, it is quite evident that it brings into play a faculty that we know nothing about. You watch it tapping all over the tree: presently it stops, begins to hammer vigorously, cuts into the hole of the borer, thrusts in its tongue, impales the borer and swallows it. How it knows where the borer is, it is impossible to say.

On one occasion I was anxious to know how many borers a woodpecker would require for its morning meal. I went to an old orchard where I knew borers were plentiful and watched some woodpeckers feeding till 11:30 or 12 o'clock. Then I shot one of the birds, took it home, and examined its stomach contents under a microscope, and there found distinct evidence that the bird had eaten eighty-two borers that morning. How long would it take you to go over those trees and fish out eighty-two borers.

Some people have an idea that woodpeckers do an injury to the trees. They say "Look at the sap-sucker, it is drilling a hole to get the sap and will kill the tree." Therefore they kill the woodpeckers and so destroy a useful friend. There is one bird of the woodpecker family, however, which is not so highly specialized for the destruction of borers as the others are, and it is fond of just opening the bark of the tree, early in the spring particularly, and feeding upon the sap. Its chief food is insects, and it destroys large quantities of wood ants, but it is not able to bore into the tree and get out the borers in the same way that most woodpeckers do. I know that bird well, and have watched it work for many years, but I never saw any harm done to trees by it.

Let us take another class of birds the utility of which is sometimes disputed by the horticulturist. I refer to the thrush family, which includes the robin. The robin is a bird that is in bad repute with fruit growers. On the other hand the farmer has no fault to find with the robin; to him it is one of the most beneficial creatures nature produces. How then are you going to reconcile the interests of the two classes? Let us see how it works out. Every bird that feeds upon insects will consume about its own weight of insects every day. Young birds before they are fledged will eat much more than that. I once took a young robin that had fallen out of its nest, and raised it until it was big enough to feed itself. It was given cut worms and the larvæ of the June beetle, and I found that it consumed five and a half ounces a day by actual weight. If you had a hardy family of boys who could get away with a proportionate amount, how long would you stay out of bankruptcy? On the other hand, the robin will undoubtedly eat some cherries and some strawberries, but that is just at one time of the year, and the quantity a robin will eat in a whole season will not exceed one pint. If you balance ten cents worth of strawberries or cherries against the damage done by 150 cut worms and white grubs during the spring season, how does the account stand? Can we afford to allow these birds the paltry quantity of berries which they take for variety? If we cannot, fruit growing is hardly a big enough business for a man to stay in.

I hope I have presented the case sufficiently clearly to enable you to form a judgment which will be favorable to the birds.

INDEX.

PAGE.

Age of trees, effect on keeping quality 46, 49
Agriculture and Arts Act 114
Algoma Fruit Station 85
Annual Report 18
Annuals 119, 124
Anthracnose of grapes 62
Apples, 11, 12, 40, 41, 42, 43, 78, 80, 82 and 87
Beall, Thos. 81
Bees, pollination by 95
Birds Eye Rot of grapes 62
Birds in relation to Horticulture ... 128
Black Rot 60
Bordeaux, strength of 65
British Columbia, fruit from 86
Brown Rot 62
Bunting, W. H. 7, 32, 36, 63
Burlington Association 75
Cameron, R. 118
Canadian Horticulturist ... 17, 21, 34, 39
Canned Fruit Industry 56
Cardinal Horticultural Society 25
Caustic soda wash for scale 67
Central Packing House 70, 73
Chapais, C. H. 77, 82
Cherries 80
Children and Horticulture 109
Clew, S. M. 113
Cold Storage 45
Committees appointed...6, 27, 35, 76, 117
Committees, Reports of 28, 36
Concessions made by Railway Companies 38
Cooperative Associations ...70, 72, 74, 76
Copper sulphate, amount required ... 65
Cowan, H. B. 21, 39, 114
Crop Reports 27, 77
DeCewsville School grounds, improvement of 111
Deseronto Horticultural Society 113
Dewey, C. E. 55
Directors' Meeting 7, 26, 27
Dryden, John 88
Evergreens, suitable varieties 101
Farm storage of fruit 47

PAGE.

Fletcher, Dr. Jas 94
Flowers, value of 91
Forest Association 73
Fruit Experiment Stations 14, 85
Fruit, Flower and Honey Show, 18, 82, 84 and 87
Fruit Growing in Quebec 77
Gamble, W. P. 56
Gilchrist, A. 115
Goodman, A. K. 108
Graham, G. E. 55
Grape Diseases 60, 61
Grapes 11, 14, 41, 60, 61, 88
Green fruit 46
Guelph Horticultural Society 113
Handling of fruit for cold storage ... 45
Harcourt, R. 65, 66
Harrison, F. C. 59
Hodgetts, P. W. 8
Horticultural Convention 97
Horticultural Societies ... 15, 28, 112, 114
Hunt, Wm. 15, 28, 126
Hutt, H. L. 40, 52, 97
James, C. C. 91
Jams, adulteration of 58
Johnson, D. 73
Lawns, care of 100
Lime Sulphur mixture 66, 67
Lindsay Horticultural Society ... 31, 113
Local Fruit Growers' Association ... 9
Lochhead, W. 60, 64
McBain Mixture 66
Macoun, W. T. 42, 61, 120
McNeill, Alex. 53, 58, 113, 20
Midland Horticultural Society 31
Millbrook Horticultural Society 30
Nash, C. W. 128
New Fruits 40, 42
Nova Scotia, fruit from 86
Nursery agents 79
Officers for 1905 6
Ornamental Shrubs, List of 102
Ottawa Horticultural Society 112
Owen Sound Horticultural Society 32
Packages for Fruit 14
Peaches 11, 56

INDEX.—*Continued.*

	Page.
Pears	11, 13, 56, 78, 80, 82, 88
Peas, Canned	57
Perennials	105, 118, 124
Picton Horticultural Society	29
Planting of Grounds	97
Plums	11, 13, 43, 44, 78, 80
Potting Plants	127
Powell, G. H.	45
Premiums	8
Preparation of lime washes	66, 68, 69
Preserved Fruit, prizes in	88
Prices of fruit in Winnipeg	51
Prices realized through cooperation.	73
Prize-List, Changes in Toronto Industrial	11
Prize-List, Fruit Show	18, 82, 87
Prize Winners, 1904	87
Quinces	11
Railway Commission	16, 34, 38
Raspberries, Canned	57
Rates, change in railway	37, 38
Refrigerator cars	51, 55
Representatives to Fair Boards	6
Resolutions	76, 79, 117
Reynolds, G. B.	50
Robson, W. M.	113
St. Catharines Association	74
St. Lawrence Fruit Station	85
Sal-soda wash for scale	67
San Jose Scale	33, 66
School grounds, planting of	97
Severity of Winter	33
Sherrington, A. E.	70, 72
Small Fruits	80
Smith, J. F.	69
Snelgrove, H. J.	115
Sparling, J. H.	55
Spraying	62, 66
Stirling Horticultural Society	20
Sweating of Apples	47
Thornbury Horticultural Society	31
Tomatoes, Canned	57
Toronto Horticultural Society	112
Toronto National Exhibition	10, 12
Transportation Committee, Report of	36
Treasurer's Report	20
Tyrrell, Ed.	112
Urquhart, Thos.	90
Varieties of Quebec	78, 80
Victoria County, Fruit Conditions in	81
Vines, hardy	120
Walkerton Association	71
Wentworth Fruit Station	85
Whyte, R. B.	112, 116, 121
Window Plants	126
Winnipeg Shipments	17, 50
Woolverton, L.	26, 35

Eleventh Annual Report

OF THE

Fruit Experiment Stations

of Ontario

UNDER THE JOINT CONTROL OF

THE ONTARIO AGRICULTURAL COLLEGE, GUELPH

AND

THE FRUIT GROWERS' ASSOCIATION OF ONTARIO

1904

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To the Honourable WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith, for the consideration of Your Honor, the report of the Fruit Experiment Stations for 1904.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

TORONTO, 1905.

Fruit Experiment Stations.

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THE ONTARIO FRUIT STATIONS.

Name.	*Fruit.*	*Experimenter.*
1. Southwestern	Peaches	W. W. Hilborn, Leamington.
2. Wentworth	Grapes	Murray Pettit, Winona.
3. Burlington	Blackberries and Currants	A. W. Peart, Burlington.
4. Lake Huron	Raspberries	A. E. Sherrington, Walkerton.
5. Georgian Bay	Plums	J. G. Mitchell, Clarksburg.
6. Simcoe	Hardy Apples & Hardy Cherries.	G. C. Caston, Craighurst.
7. Bay of Quinte	Apples	W H. Dempsey, Trenton.
8. St. Lawrence	Hardy Plums and Hardy Pears.	Harold Jones, Maitland.
9. Strawberry Station		E. B. Stevenson, Ponsonby.
10. Maplehurst	Cherries. Peaches, Pears, Plums and other tender fruits; also a general collection of all kinds of fruits for descriptive work for "Fruits of Ontario."	L Woolverton, Grimsby, Ont.
11. Algoma	Hardy Fruits	C. Young, Richard's Landing.
12. Wabigoon	Hardy Fruits	A E. Annis, Dryden.
13. New Ontario*	Hardy Fruits	

*Collections of fruits for trial have been sent to G. S. Royce and S. B. Bisbee, New Liskeard; to C. Chapman, Judge, and to F. Theaker, Hanbury, in the Temiskaming District.

Eleventh Annual Report

OF THE

Ontario Fruit Experiment Stations.

To the Honourable the Minister of Agriculture:

Sir,—I have the honor to send you the Eleventh Annual Report of the Ontario Fruit Experiment Stations, which is every year becoming of greater value to the fruit growers of Ontario. It is the intention of the Board to enter at once upon some new lines of work, such as the best means of winter protection for the roots of the peach trees at our southwestern station, and more extended trials of the adaptation of the best commercial varieties of all fruits to the various sections of the Province. I have the honor to be, sir,

Your obedient servant,

LINUS WOOLVERTON,

Secretary of the Board of Control

DECEMBER, 1904

FRUITS OF ONTARIO.

Described and Illustrated by Mr. L. Woolverton, Secretary of the Board of Control of the Ontario Fruit Experiment Stations.

Fruit growing has become so important an industry in the Province of Ontario, that it deserves every encouragement at the hands of the Department of Agriculture. The Canadian farmer who contemplates growing fruit asks for information on two points in particular, viz., (1) What fruits shall I plant, and (2) How shall I cultivate them? The latter of these questions it is the province of the Ontario Fruit Growers' Association to answer through the "Canadian Horticulturist" and the annual Report, while the former question is one that can be solved only by years of patient experimental work by our fruit experiment stations.

Of equal importance is some means of indentifying all varieties now grown in our Province, and of knowing with some degree of exactness the size, color, general appearance and real value of these varieties aside from the catalogues of the nurserymen. To meet this latter need, the Secretary, with the advice and approval of the Board of Control, has begun the work of illustrating and describing the fruits of Ontario; and in this work he desires to acknowledge the valuable aid of the various fruit experimenters. The illustrations are new and original, having been engraved from photographs made the exact size of the fruit samples, except where otherwise specified, and in this way there will in time be made accessible to the Ontario fruit growers a complete guide to all the fruits grown in the Province. Such a work necessarily must be slow and tedious, but it is all important that it should be characterized by scientific accuracy, and the writer invites notes or criticism from pomologists generally

Terms Used in Descriptions.

In the Tables it has been customary to use the figures 1 to 10 to show order of value, 1 being the lowest and 10 the highest.

In the descriptions the following terms are used to correspond with these numbers:—

1 to 3, Poor	Third class.
4 to 5, Fair or Moderate 6 to 7, Good	Second class.
7 to 8 to 9, Very good 10, Best	First class.

APPLES.

BAXTER (La Rue).

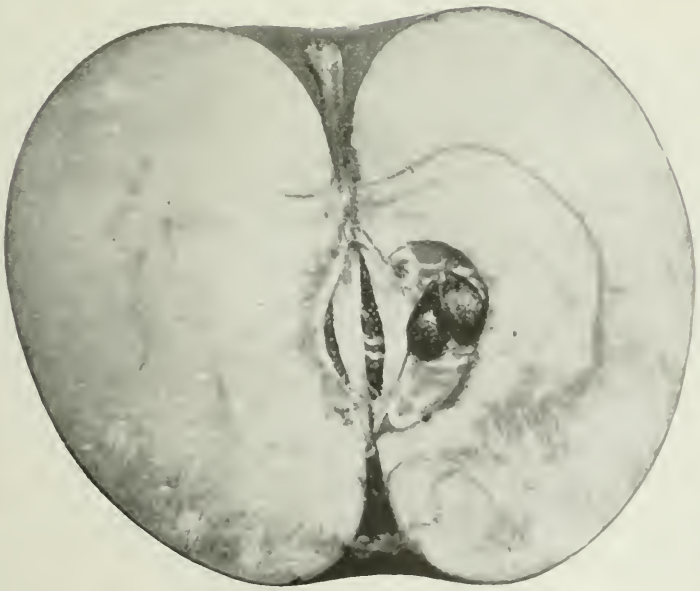
A fine large red apple, which brings a high price in the British market if grown free from fungous spots, to which unfortunately it is somewhat subject.

Origin: With Mr. La Rue, near Brockville, Leeds Co., Ontario, but introduced by Mr. Baxter.

Tree: Healthy, vigorous, hardy, moderately productive.

Fruit: Size large, 3x3½: form roundish, slightly conical; color red; stem ¾ of an inch in a narrow, funnel form cavity.

Baxter.



Section of Baxter.

Flesh: White; texture firm; flavor slightly acid.

Season: October to February.

Quality; Dessert poor; cooking good.

Value: Home and foreign market, very good.

Adaptation: Reported to be a profitable variety at our Simcoe Fruit Station, and along the St. Lawrence River.

BOTTLE GREENING.

Bottle Greening.

An apple grown in some parts of Ontario for home uses, for which its excellent quality makes it very desirable; it is not recommended for the commercial orchard, because the fruit is rather tender for shipment to distant markets.

Origin: According o Chas. Downing this variety was found near the border line between Vermont and New York State, and takes its name from a hollow in the original tree, where workmen were accustomed to keeping their bottle.

Tree: Vigorous; fairly productive.

Fruit: Large. $2\frac{5}{8}$ x $3\frac{1}{4}$ inches; form oblate, slightly conical; color yellowish with bright red on one side, a thin bloom and a few light dots; stem half an inch long in a deep, funnel form cavity; calyx nearly closed, in a moderately deep, slightly plaited basin.

Flesh: greenish white; texture fine tender, juicy; flavor subacid, almost melting, excellent.

Season: November to February.

Quality: Dessert, very good.

Value: Home market, first class; distant market, second class.

Section of Bottle Greening.

THE MAIDEN'S BLUSH.

Maiden's Blush.

A valuable apple for the amateur because of its extreme beauty, but not considered a very profitable market variety by Ontario fruit growers.

Origin: New Jersey

Tree: Moderately vigorous grower, and fairly productive.

Fruit: Size large, 2 x 3 inches; form oblate, very regular, but slightly one-sided; color lemon yellow with beautiful crimson blush; stem $\frac{3}{4}$ of an inch long, set in a moderately deep, wide cavity; calyx closed, in a shallow, slightly wrinkled basin.

Flesh: Color white; texture fine, tender; flavor pleasant; subacid.

Season: September and October.

Quality: Dessert, fair; cooking, good.

Value: Good for all markets.

Section of Maiden's Blush.

McINTOSH RED.

A very fine dessert apple for early winter use. At Ottawa and along the St. Lawrence and other places where conditions are favorable, it is counted one of the best dessert apples of its season, adapted and profitable for export, but in the Niagara District it is worthless, owing to scab.

Origin : With John McIntosh, Dundela, Ont., in whose orchard the original tree is still standing (1904.)

Tree : Hardy, vigorous ; fairly upright ; fairly productive ; an annual bearer ; of Fameuse type ; inclined to drop its fruit last of September in Niagara District.

McIntosh Red (*reduced*).

Fruit : Size medium to large, $2\frac{1}{4}$ x 3 inches ; form somewhat oblate ; color, deep crimson in sun, light crimson on shady side, inclined to show broken stripes and yellow dots, often with a heavy blue bloom ; stem one inch in length, slender, set in a wide, and often somewhat irregular cavity, which is green at bottom ; calyx closed in a smooth regular, rather shallow basin.

Section of McIntosh Red.

Flesh : Snow white ; texture crisp tender, very juicy ; flavor slightly sub-acid, aromatic, perfumed near the skin.

Quality : Dessert first-class.

Value : Market first-class where fruit grows to perfection, but worthless where it scabs, except where very thoroughly sprayed.

Season : November to January ; quite ready for eating by November first in Niagara Disirict.

Adaptation : Northern apple districts ; succeeds at Trenton and St. Lawrence stations.

NEWTOWN PIPPIN.

Newtown Pippin.

The highest priced apple that reaches the English markets, but not much grown in Ontario because the fruit is subject to the apple scab.

Origin: Newtown, Long Island.

Tree: A slow grower and only moderately hardy; needs rich soil and good cultivation.

Fruit: Medium to large; the sample photographed was grown near Simcoe, Ont., and measured 3½ x 3¼ inches; form, roundish oblique, with broad obscure ribs terminating in five crowns at the apex; color, dull green, becoming yellowish green during the winter, with reddish brown tinge on the sunny side, and dotted with small grey russety dots; stalk, three-quarters of an inch long, inserted all its length in a deep, wide funnel-shaped cavity; calyx small, closed in a small, moderately deep basin.

Flesh: Greenish-white; texture firm, crisp, juicy; flavor, rich and highly aromatic.

Season: December to May, at its best in March.

Value: Home markets, good; British market, first class.

Quality: Cooking, first-class; dessert, first-class.

Adaptability: Only to certain favored sections.

Section of Newtown Pippin.

SALOME.

A new Western apple which promises to be of some value in the Province of Ontario. The hardiness of the tree, the clean bright color of the fruit and its long keeping quality seem to combine in its favor as a commercial variety, especially in the colder sections. C. L. Stephens, of Orillia, fruited it in his garden in 1903, and says he kept samples until June. The specimen photographed was sent us by him on the 16th of April, 1904, and was in fine condition.

Origin : E. C. Hathaway, Ottawa, Illinois.

Tree : Very hardy, productive, a slow grower, an early and an annual bearer.

Fruit : Size medium, the sample photographed was large, 3 x 3 inches, but some growers report it small : form roundish, conical, somewhat angular or lopsided ; color bright red with stripes of darker red and numerous small grey dots, on a yellowish ground ; when harvested the skin is green, but during the winter it takes on the coloring above described, making it very attractive ; stem stout, $\frac{3}{4}$ of an inch long, set in a deep, uneven cavity ; calyx half closed, segments erect, in a moderately deep, slightly plaited basin, having five distinct prominences ; core large, open, sessile.

Salome (*enlarged*).

Flesh : Color yellowish ; texture tender, firm, becoming toward spring moderately juicy ; flavor pleasant, sub-acid.

Season : November to May.

Quality : Dessert or cooking, fair to good.

Value : Promising for export.

Adaptation : Succeeds remarkably well in the County of Simcoe. Mr. C. L. Stephens, of Orillia, who has fruited it there, counts it one of his hardiest varieties. Mr. John Craig, formerly horticulturist at the Central Experimental Farm, Ottawa, reported that three trees had been planted there in 1888, and had not been injured by the winter ; he believed it possessed of superior hardiness.

At our St. Lawrence station this apple has not been a success. Mr. Jones says in his report for 1902, "Salome has fruited with me the second time, and although the tree is a hardy, vigorous grower, the fruit has proved very unsatisfactory, being of small size, less than two inches in diameter, poorly colored and liable to drop before maturity."

At our Bay of Quinte station the fruit is reported as being medium to large, and of good quality, and the tree as being productive.

SCARLET PIPPIN.

A fancy dessert apple which is esteemed profitable to grow for market in Leeds County.

Origin: Near Brockville in Leeds County. A chance seedling.

Tree: Upright in habit; hardy; vigorous and very productive; inclined to overbear.

Fruit: Roundish oblate, averaging 2¼ long by 2¾ broad; skin, waxy white streaked; splashed or almost entirely covered with bright scarlet covering; stem stout, ½ to ¾ inch long in a narrow, moderately deep cavity; calyx, closed in a narrow, very shallow basin.

Scarlet Pippin.

Section of Scarlet Pippin.

Flesh: Pure white; texture, tender, fine, crisp, breaking, juicy, with a brisk, sub-acid flavor.

Season: October to February; at its best in October and November.

Quality: Dessert, best; cooking good

Value: Home market, very good export, fair.

SHIAWASSEE.

(Shiawassee Beauty.)

Shiawassee Beauty.

Perhaps the finest variety of the Fameuse type, next to the Fameuse itself, and much less subject to scab than that variety. A fancy variety for dessert purposes.

Origin: In Shiawassee County, Michigan, supposed to be a seedling of Fameuse.

Tree: hardy; vigorous; upright; productive alternate years.

Fruit: Size large, $2\frac{1}{2}$x$3\frac{1}{4}$ inches; form decidely oblate; color yellowish ground, almost entirely covered with stripes, splashings and mottlings of dark crimson, and a few large prominent yellowish dots; stem slender, $\frac{3}{4}$ of an inch long, set in a broad deep cavity; calyx usually closed, in a large deep basin.

Flesh: Color very white; texture firm, very crisp, juicy, fine grained; flavor excellent.

Season: October to January.

Quality: Cooking, fair; dessert very good.

Value: Home or foreign market very promising.

Adaptation: Succeeds well at our Simcoe station.

Section of Shiawassee Beauty.

STUMP.

Stump.

An attractive looking fall apple, sometimes shown at our Provincial Fair; considered a fairly profitable variety.

Origin: United States; Thomas says in Monroe County, N. Y., while Downing supposes that it originated in the State of Delaware.

Tree: Spreading, productive.

Fruit: Size medium, sample photographed was $2\frac{3}{4}$x$3\frac{1}{8}$; form, oblate conical; color, yellowish, splashed and blotched, with bright red; stem, stout, $\frac{3}{8}$ of an inch long, in a narrow moderately deep, funnel shaped cavity; calyx, half open, set in a deep wrinkled basin.

Flesh: Color, white; texture, crisp, juicy, firm; flavor, sub-acid.

Season: September and October.

Quality: Fair for dessert; good for cooking.

Value: Home market, good; foreign market, good or about second rate.

Section of Stump.

TOLMAN SWEET.

Tolman Sweet.

The best winter sweet apple; valuable for baking and by some people esteemed a good dessert apple; useful also as stock feed, in place of roots; not of much value for export.

Origin: A native of Rhode Island.

Tree: A vigorous grower, very productive and very hardy: valuable as a stock upon which to top graft other and more tender varieties, as, for example, the King, which is more productive, and the Spy, which may be grown farther north, when top grafted upon the Tolman Sweet than when upon common stock.

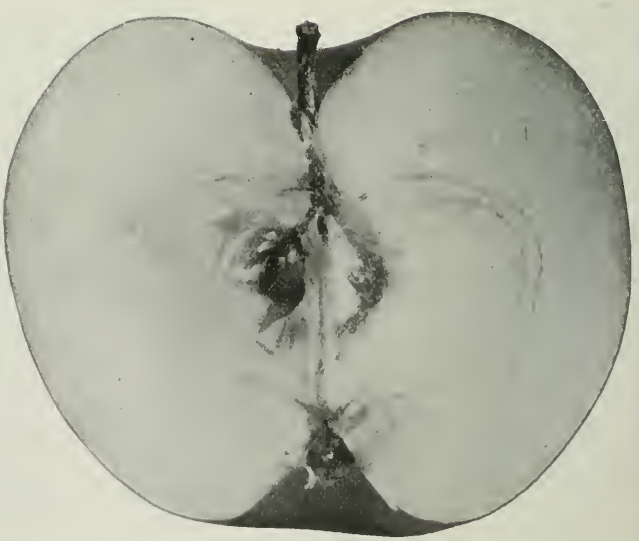
Fruit: Size medium to large, the sample being $2\frac{3}{4}$ inches long by $3\frac{1}{4}$ broad; form roundish; color light yellow, sometimes with reddish cheek, and a line from stem to calyx; stem half an inch long, often inclined, inserted in a wide shallow cavity; calyx closed in a small shallow basin.

Flesh: Color white: texture firm, fine grained; flavor, sweet, rich.

Quality: Dessert, good; cooking fair.

Market Value: Second rate, except in special markets and in limited quantities.

Season: November to April.



Section of Tolman Sweet.

WAGENER.

Wagener.

A fine dessert apple when grown and highly colored, but samples grown in the shade are inferior both in appearance and in flavor. The texture of the fruit is too tender to be planted in the commercial orchard.

Origin: Penn Yan, N.Y.

Tree: Fairly vigorous, hardy and an early bearer.

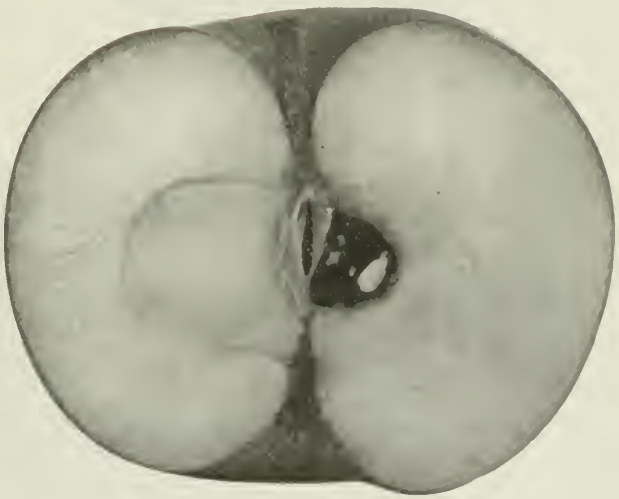
Fruit: Medium to large, sample photographed 2½ x 3¼ inches; form oblate; color yellow, nearly covered with crimson, obscurely striped, with a few light dots; stem about ¾ of an inch long, inserted in a broad, deep irregular cavity; calyx closed, set in a funnel form, somewhat corrugated basin.

Flesh: Yellowish; texture fine grained, very tender, juicy; flavor subacid, very agreeable.

Season: November to February.

Quality: Dessert very good; cooking good.

Value: Home market, good; foreign market, fair.



Section of Wagener.

YELLOW BELLFLOWER.

(Bishop's Pippin of Nova Scotia.)

A favorite commercial apple in the United States, especially as grown on the sandy soils of New Jersey; a popular variety in the Philadelphia market. At one time the Bellflower was planted to some extent in Ontario orchards, but the tree has proved itself irregular in its bearing habits, sometimes producing magnificent samples, and at other times small and poorly colored fruit, and the fruit is tender and shows very slight bruises, so that we cannot recommend it as worthy of a place among the most profitable varieties.

Yellow Bellflower.

Origin: Burlington, N. J.

Tree: Vigorous, forming a roundish, spreading and somewhat drooping head; productive alternate years.

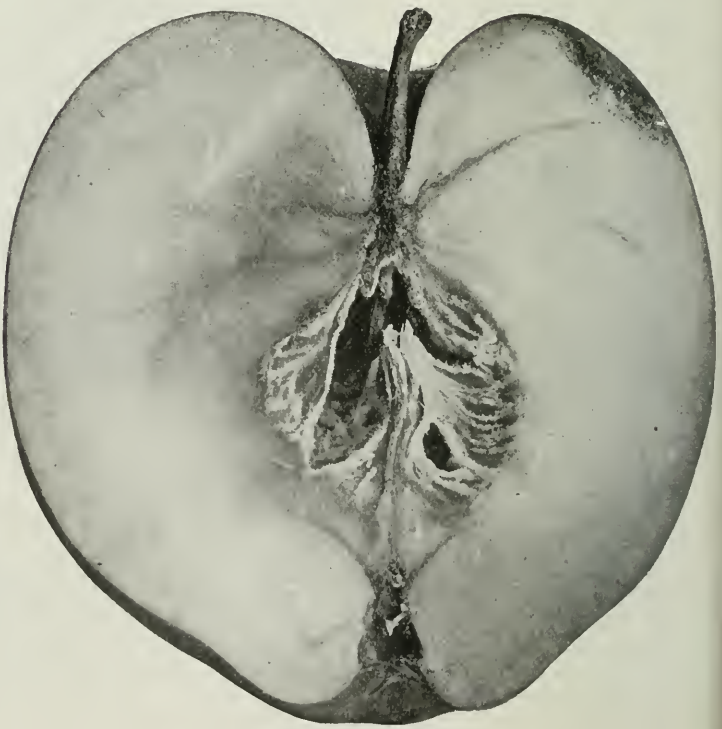
Fruit: size large, $3\frac{1}{2}$x$3\frac{1}{2}$ inches; form apparently oblong, because papering towards calyx, somewhat angular and ribbed; color pale yellow, often with a beautiful blush on the sunny side and numerous obscure whitish dots; stem slender, one inch long, in a narrow deep cavity; calyx closed in a small corrugated basin.

Flesh: Color yellow; texture tender, juicy and crisp; flavor sprightly sub-acid, agreeable when eaten in season.

Season: December to February.

Quality: Dessert good; cooking good.

Value: market, good; might be called first class, only that the skin shows bruises easily.



Section of Yellow Bellflower.

YORK IMPERIAL.

York Imperial.

A fine export market apple, highly valued in some of the American States, but not yet much grown in Ontario.

Origin: York County, Pa.

Tree: A moderate grower, productive.

Fruit: Medium in size; angular, oblique; color of skin, bright red in shades, stripes and splashes on a yellowish ground; stem ½ inch long in a deep funnel shaped cavity; calyx nearly closed in an irregular deep, slightly plaited basin.

Flesh: Yellowish; texture firm and juicy; flavor, sub-acid, good.

Quality: dessert fair; cooking good.

Value: First class for market.

Season: Winter.

Section of York Imperial.

BLACKBERRIES.

BRITON.
(Ancient Briton.)

Counted one of the best varieties where it succeeds; it is a special favorite with fruit-growers in Wisconsin, in which State it originated.

Origin: A Wisconsin seedling found by A. H. Briton; first mentioned in the "Report of the Wisconsin Horticultural Society, 1869."

Plant: Hardy, vigorous and fairly productive. Budd in his "Systematic Pomology," speaks of it as one of the hardiest varieties yet tested.

Ancient Briton.

Berry: Medium to large, ⅞ of an inch long by ¾ broad; form, oblong, conical; texture, melting; flavor, very pleasant.

Season: 1st to 10th August; (July 21st to August 10th, 1901).

ELDORADO.

A hardy and productive variety. At our Walkerton station, the Eldorado heads the list for profit; but at our Burlington station, it is reported as not very productive.

Origin: Accidental seedling near Preble, Ohio, about 1882.

Bush: A strong, vigorous grower; healthy; hardy; moderately productive.

Eldorado.

Berry: Medium to large, $\frac{7}{8}$ x $\frac{3}{4}$ of an inch in length and breadth; oblong, conical, irregular; drupes large; seeds and core small; flavor, sprightly, pleasant

Quality: Table, very good.

Value: Market, good.

Season: August 1st to 20th, 1904.

WACHUSETTS.

This blackberry was first introduced as Wachusett's Thornless, on account of its comparative freedom from spines. This, however, is the chief point in its favor, as the plant is not productive enough to be of value to the Ontario fruit grower.

Origin : A wild plant on Monadnock Mountain, Massachusetts.

Bush : A slow grower, at first upright, afterward drooping ; healthy, not very productive ; spines few, fruit clusters few.

Wachusetts.

Berry : Size, medium, $\frac{7}{8}$ of an inch long by $\frac{3}{4}$ broad ; form roundish, moderately firm, of good quality.

Season : Medium, last week in July to third week in August.

Value : Market, fair.

Adaptation : Hardy at our Walkerton station : Budd of Iowa speaks of it as more productive on high, light-colored soils than on rich black soils.

TAYLOR.

(Taylor's Prolific.)

Considered by some a valuable commercial berry for the colder sections, its season being later than Snyder.

Origin; Introduced by Mr. Taylor, of Spiceland, Indiana, about the year 1867.

Bush: Hardy, vigorous and productive.

Taylor.

Berry: Large, $\frac{7}{8}$x$\frac{3}{4}$ of an inch; roundish oblong; texture, soft and juicy; flavor, rich and moderately sweet.

Season: August.

GRAPES.

GREEN MOUNTAIN (WINCHELL).

The best white grape of its season for the dessert table. Not much planted for market.
Origin: Green Mountains of Vermont, by a Mr. Winchell, after whom it has been very properly named; but among fruit growers the name Green Mountain has the preference.
Vine: Hardy, healthy, only fairly vigorous and fairly productive.
Bunch: From 5 to 6 inches in length; compact; well shouldered.

Green Mountain.

Berry: Color greenish white; size medium, ½ to 9-16 of an inch in diameter; skin thin; pulp tender; flavor sweet and excellent; seeds few and small.
Quality: Dessert, first class.
Value: Market, second class.
Season: End of August.

EMPIRE STATE.

A beautiful white grape, with well formed bunches, which was introduced with great eclat, but has not become very popular in the commercial vineyards of Ontario.

Origin: From seed of Hartford fertilized with Clinton, raised by James H. Ricketts. The entire stock was sold to Geo. A. Stone, of Rochester, for $4,000.

Empire State.

Vine: Vigorous, healthy, and moderately productive.

Bunch: Size large, 6 to 8 inches long; shouldered; compact.

Berry: Medium, ¾ of an inch in diameter; color white, with thick bloom; pulp tender, juicy, sweet, and agreeable.

Quality: Dessert, very good. Value: Market, good.

MOORE'S EARLY.

A favorite with vineyardists in Ontario, because of its earliness and its good quality. As early as Champion and of very much better quality, it is superseding that miserable variety which has done so much to prejudice buyers against our black grapes.

Origin: By John B. Moore, at Concord, Mass., from Concord seed, in the year 1872.

Vine: Hardy, healthy, fairly vigorous, but only moderately productive, if compared with the Concord; needs good cultivation.

Moore's Early.

Bunch: Smaller than Concord, and rarely shouldered; length of sample, 5¼ inches.
Berries: Averaging a little larger than those of the Concord; round; black; thin bloom.
Flesh; Vinous, juicy, with slight foxiness.
Quality: Good.
Value: First class of its season.
Season: Early September.

WOODRUFF.

(Woodruff's Red).

An attractive red grape, which promises to be profitable.

Origin: C. H. Woodruff, Ann Arbor, Mich., in 1874; a chance seedling thought to be a cross between Catawba and Concord.

Vine: Vigorous, hardy, productive; somewhat subject to black rot.

Woodruff.

Bunch: Good size, about five inches long by four across; shouldered; compact

Berry: Large, often one inch in diameter; round; red with thin bloom; does not crack.

Season: About the same as Concord.

Quality: Dessert, good.

Value: Market, first-class.

PEACHES.

BOWSLAUGH.

Esteemed for canning, but inferior in size to the Longhurst, which it closely resembles.

Origin: Grimsby, Ontario, with a Mr. Bowslaugh.

Tree: Productive.

Bowslaugh.

Fruit: Size small to medium, 2½ inches long by 2 inches broad; color of skin yellow with a dull red cheek; suture traceable more than half way around; cavity deep, irregular apex prominent.

Flesh: Free from pit; yellow pink at pit; texture tender, not very juicy; lacking in flavor, neither sweet nor acid.

Quality: Dessert poor; cooking fair to good.

Value: Market, second class.

Season: First half of October.

CARLISLE.

Carlisle.

A good late peach with white skin, a little later than Smock, averaging larger in size; it would be more popular for market had it more color.

Tree: Vigorous; productive.

Fruit: Ovate, somewhat flat; suture deep on one side and terminating in a prominent apex; size large, often 3 inches long by 2½ broad; skin pale yellow, almost white, slightly tinted and spotted with crimson on sunny side; cavity narrow and moderately deep.

Flesh: Nearly free; color, white; discolors quickly after cutting; texture juicy, tender, but not soft; flavor rich, good, moderately sweet, if well ripened; rather disappointing in 1904.

Season: Last half of October (in 1904); (September 1st to 15th, 1902).

Quality: Dessert fair; cooking good, but requires more time than some varieties.

Value: First class in its season for market on account of its large size.

Section of Carlisle.

CHAMPION.

Champion.

A beautiful white fleshed peach with a red cheek, and free stone. The flavor is delicious, and it may be classed as the best dessert peach of its season, but a little tender for distant shipments.

Origin : Illinois.

Tree : Vigorous, moderately productive.

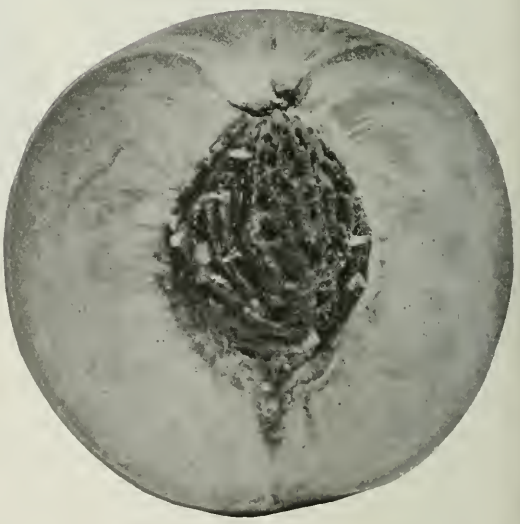
Fruit : Large, frequently measuring 2½ inches in diameter ; form roundish, fairly regular ; color of skin, creamy white, with red cheek in the sun ; suture two thirds ; apex small in a slight depression ; cavity deep ; stone free.

Flesh : White, pinkish at the pit ; texture fine, tender, juicy ; flavor rich, sweet and agreeable.

Season : September 1st to 10th, coming in with last Yellow St. John and the first Early Crawfords.

Quality : Dessert among the best.

Value : Very good for home markets, and a good shipper.



Section of Champion.

EARLY MICHIGAN.

Early Michigan.

A very good dessert peach

Origin: Georgia.

Tree: Healthy, vigorous and productive.

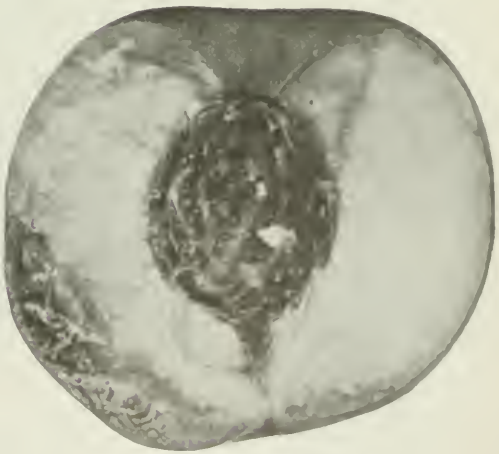
Fruit: Medium, 2 inches long by 2¼ wide; form round; color cream or greenish white ground nearly covered with crimson; cavity large and deep; suture very distinct from cavity to apex and beyond; pit a clingstone.

Flesh: Greenish white, red at pit; texture tender and juicy; flavor sub-acid, very pleasant.

Quality: Dessert very good.

Value: Market fair.

Season: Middle of August.



Section of Early Michigan.

FITZGERALD PEACH.

Fitzgerald.

Since the Early Crawford has been such a popular peach both for home use and market, every new introduction of a variety which is of the same class, has been welcomed by the public, especially as it may be used to extend the season. The Fitzgerald is not as large as the Early Crawford, but to many the flavor is finer for dessert, and its season is a trifle later. Like the latter, it is too tender for long shipments.

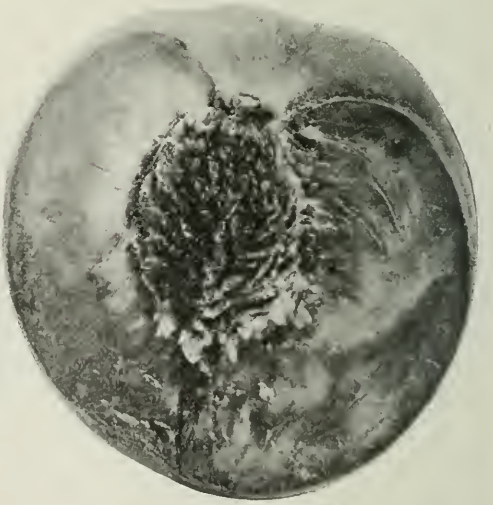
Origin: In the garden of Mr. Fitzgerald, Oakville, Ontario, about 1895.

Tree: Hardy, healthy and productive.

Fruit: Size two and a quarter inches at either diameter; form roundish ovate; color bright yellow, covered with deep red; down moderate in quality; cavity broad and deep; apex a small point in a slightly depressed basin; suture distinct; stone free.

Flesh: Yellow, with red at pit; texture tender and juicy; flavor excellent.

Season: September 7th to 15th.



Section of Fitzgerald.

GREENSBORO.

Greensboro.

The best dessert peach of its season, but too tender in flesh to be a good shipper; worthy of a place in the home garden.

Origin: North Carolina.

Tree: Vigorous; very productive, the trees at Maplehurst were breaking down with their heavy load of fruit in August, 1902; an early bearer.

Fruit: Large; form flattened; 2½ inches long by 2¼ wide one way and 2 the other; color a deep cream with bright red cheek; cavity narrow deep; suture slight; apex sunken; not subject to rot.

Flesh: Color cream; texture tender, melting, very juicy; flavor sweet and agreeable; free stone.

Quality: Dessert, good.

Section of Greensboro.

Value: Near market very good; distant market fair.

Season: August 15th to 20th in 1904; harvested August 17th, 1904.

HALE.

(Hale's Early.)

An early peach of very beautiful appearance, but inclined to rot before it ripens. The flesh remains firm, even after the outside presents the appearance of being ripe, so that it is not a favorite variety. Its comparative earliness at one time made it a very popular market variety, but its season is now preceded by that of Sneed, Greensboro, Early Rivers, and Triumph.

Origin: Ohio.

Tree: Vigorous, healthy and productive.

Hales.

Section of Hales.

Fruit: Medium to large, sample was 2¼ inches long by 2½ broad; form roundish; color of skin dark red on sunny side, green with splash of red on shady side; apex small, slightly pointed in dimpled depression; cavity deep; suture extends to apex; pit half free.

Flesh: Greenish yellow to white; texture firm until very ripe, then melting and juicy; flavor sweet and agreeable.

Season: August 20th to 25th.

Quality: Dessert good; cooking fair.

Value: Home market, very good.

JACQUES RARERIPE.

A fine yellow peach, succeeding the Early Crawford, but too tender in flesh for distant shipment.

Origin: Massachusetts.

Tree: Vigorous, healthy and productive.

Fruit: Size large, $2\frac{1}{2}$ x $2\frac{3}{4}$; form roundish oblate; color dark yellow, shaded with red, especially on the sunny side; down heavy; cavity large and deep; apex in a depression; suture distinct; stone free.

Jacques Rareripe.

Section of Jacques Rareripe.

Flesh: Color deep yellow, red at the pit; texture, tender, juicy; flavor good, not very sweet.

Season: September 15th to 20th.

Quality: Dessert good; cooking very good.

Value: Near market, first class; distant market, second class.

KALAMAZOO.

A popular market peach in Michigan ; inferior to Elberta.

Origin : Michigan.

Tree : Vigorous and very productive.

Fruit : Medium in size, sample was 2 x 2 inches ; form roundish oval, sides unequal ; color yellow with red cheek ; cavity deep, narrow, irregular ; apex a small point in a slight depression ; suture traceable beyond the apex ; freestone.

Kalamazoo.

Flesh : Color yellow, red at pit ; texture moderately tender and juicy ; flavor fairly sweet.

Season : Usually September 15th to 20th ; in 1904 its season was from the 5th to 10th October, in Niagara district.

Quality : Dessert, poor ; cooking, good.

Value : Near market, good ; rather too small to sell with Elberta, or even to follow that large showy variety.

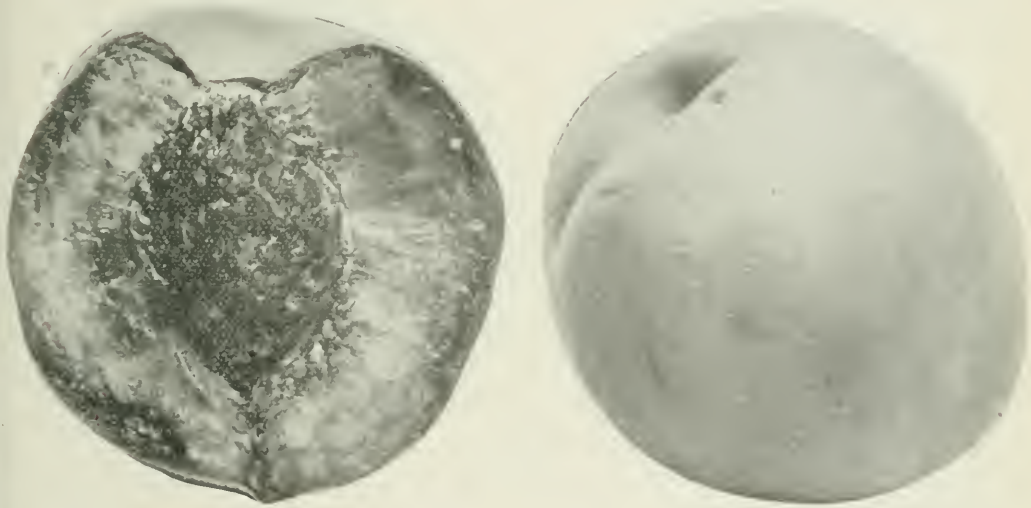
LATE CRAWFORD.

A fine large yellow peach, not quite equal to Early Crawford in flavor. It has not been very profitable because the tree is not very productive and the fruit is inclined to drop before it reaches its best condition.

Origin: New Jersey.

Tree: Vigorous; fairly productive.

Fruit: Large to very large, often $2\frac{1}{2}$ inches x $2\frac{3}{4}$; color dull yellow or olive green with dark red cheek; cavity large and deep; suture traceable; free stone.



Late Crawford.

Flesh: Deep yellow, red at the stone; texture juicy and melting; flavor rich, juicy, vinous.

Quality: Dessert poor; cooking very good.

Value: Market, first class.

Season: End of September.

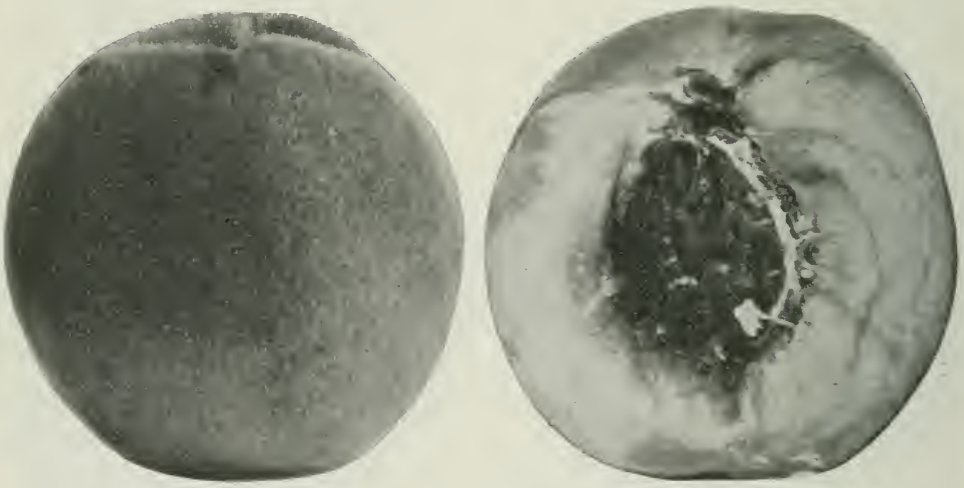
LEWIS.

A fine market peach to succeed Yellow St. John and to precede Early Crawford.

Origin: Michigan.

Tree: Healthy, vigorous, very productive.

Fruit: Medium to large; form round; color yellowish white, largely overspread with red; suture depressed.



Lewis.

Flesh: Yellowish white, red next the pit; texture tender, juicy; flavor very pleasant.

Quality: Dessert, good; cooking good.

Value: Home markets, first class; distant markets, second class.

Season: September 10th to 15th.

LONGHURST.

A very productive late variety, highly esteemed for canning and for table use. It is considered a profitable variety by many peach growers, but unless given the best culture the fruit is small and unattractive in appearance.

Tree: Hardy; fairly vigorous; very productive. Budd says the fruit buds of this variety have proven exceptionally hardy in Michigan.

Fruit: Medium in size, 2½ by 2¼ inches; form oval, larger on side of suture, which is clearly traceable, ending in a pointed apex; color dull yellow, with dark red cheek in sun; down thick; cavity deep, abrupt, shouldered; pit small, free.

Longhurst.

Section of Longhurst

Flesh: Color yellow, red at pit; texture tender, almost buttery, moderately juicy; flavor vinous, sweet, agreeable.

Season: Usually end of September; in 1904, the first week in October.

Quality: Dessert, fair; cooking or preserving, very good.

Market value: Second class, unless unusually well grown.

NEW PROLIFIC.

A peach of the Crawford type, a few days later, which is highly esteemed by many peach growers. Like the Crawford it is too tender in flesh for distant shipment, unless picked from the tree before it reaches full maturity.

Tree: Healthy; vigorous; productive.

Fruit: Size medium to large, measuring $2\frac{1}{4}$ to $2\frac{1}{2}$ inches in either diameter; form round; color yellow, with bright red cheek; cavity narrow and deep; suture distinct, extending beyond the apex.

New Prolific.

Flesh: Yellow; texture tender, juicy; flavor sweet, delicate, very pleasant; free from tip

Quality: dessert, first class; cooking, first class.

Value: Home markets, very good.

Season: September 20th to 25th.

TYHURST.

A very attractive golden-yellow peach; considered a profitable variety for the commercial orchard. After fruiting it several years at our Maplehurst station, we think its value has been somewhat over-estimated.

Origin: A seedling raised by Mr. Tyhurst, of Leamington, Essex County. This gentleman was so pleased with the peach that he planted nearly his whole farm with trees grown from its pits, and made considerable money out of his venture.

Tree: Moderately vigorous; quite productive; fruit is inclined to drop as soon as ripe.

Tyhurst.

Fruit: Size medium, 2¼ inches long by 2 inches broad; form ovate; suture distinct on one side, terminating in a small black sharp point; color deep yellow, with tinge of red in the sun; skin separates easily from the flesh.

Flesh: Free; color pale yellow; texture very tender, fine grained, melting, juicy; flavor excellent.

Quality: Dessert, very good to best; cooking, very good.

Value: Home market, first class; distant market, second class because too tender.

Season: September 10th to 20th (1904).

PEARS.

ANSAULT.

A good general purpose pear for home uses.

Origin : France.

Tree : An early and abundant bearer.

Fruit : Size medium, $2\frac{1}{2}$ by $2\frac{5}{8}$ inches ; roundish oblate pyriform ; skin green, yellowing at maturity, mostly covered with russet ; stem $\frac{1}{2}$ inch to one inch long, in a small irregular, often oblique cavity ; calyx small, open in an abrupt, deep basin.

Ansault.

Flesh : Color creamy white ; texture tender, fine grained, buttery, juicy ; flavor agreeable, aromatic, very pleasant.

Season : September.

Quality : Fair for all purposes.

Value : Home market, fair ; distant, poor.

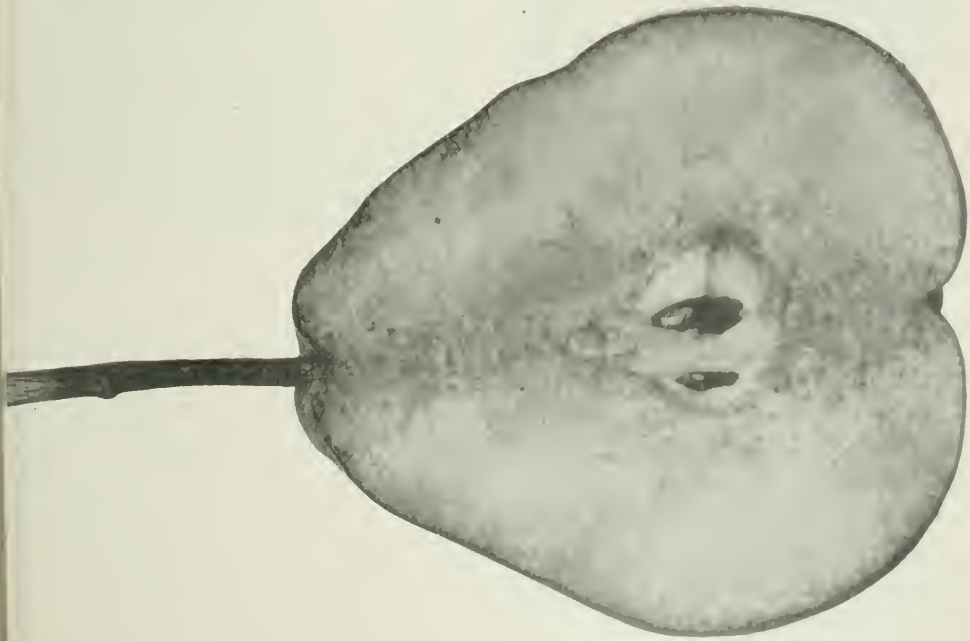
Adaptation to Province of Ontario : Not widely tested.

BAUDRY.

A promising new winter pear, which has been fruiting at our Maplehurst station as a dwarf.
Fruit: Size large, 3½ x 3¼; form oblong, pyriform; color yellowish green, with russet patches.
Flesh: Color yellow; texture tender, but gritty at the core; flavor very good.

Baudry.

Quality: Very good for dessert and cooking.
Value: First class for market.
Season: Late winter.

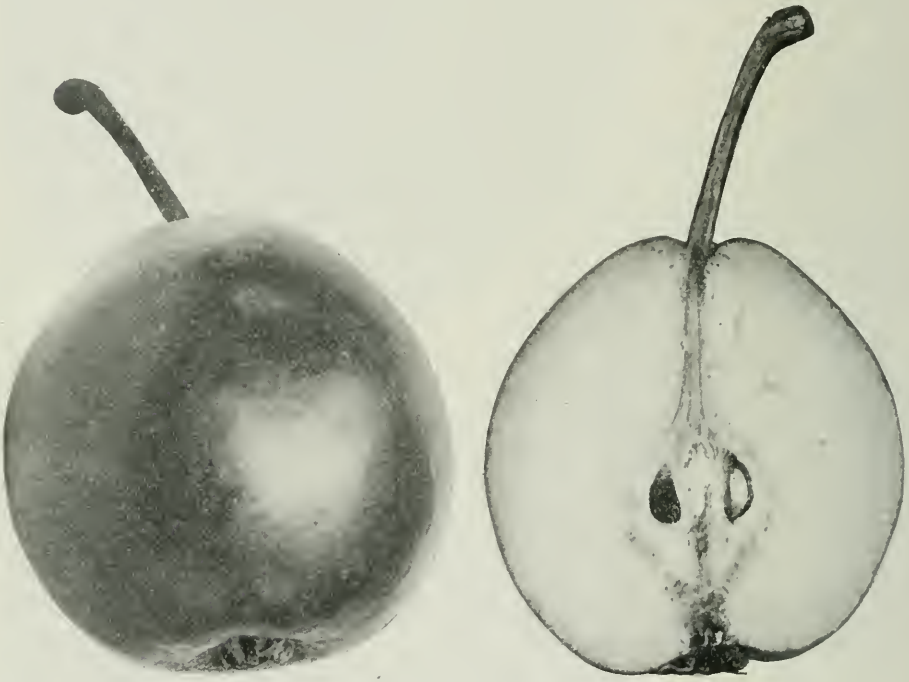


Section of Baudry.

DEARBORN.

(Dearborn's Seedling).

Previous to the introduction of such choice early varieties as Chambers, Wilder, Giffard and Clapps Favorite, the Dearborn was highly commended. Downing calls it, "a very admirable early pear of first quality, succeeding Bloodgood, and preceding Bartlett;" but it is no longer to be commended for planting in the commercial orchard because of its small size. We have grown it for thirty years at Maplehurst and now consider it only valuable in the garden of the amateur.



Dearborn's Seedling.

Origin: At Boston, Mass., in 1818, by the Hon. H. G. S. Dearborn.

Tree: Of moderate vigor; not subject to blight; very productive.

Fruit: Size, small, $2\frac{1}{4}$ x $2\frac{1}{8}$ inches; roundish obovate; skin, clear yellow with small grey dots, smooth; stem, 1 inch to $1\frac{1}{4}$ inch long, insertted with little or no cavity; calyx open in shallow basin.

Flesh: Creamy white; texture tender, buttery, juicy; flavor agreeable.

Quality: Dessert, fair; cooking, good.

Value: Market, third class.

Season: Middle to end of August.

LAWSON.

(Comet.)

Lawson.

The most beautiful pear of its season, which is about the middle of August, but inclined to rot at core and become mealy if left hanging too long. Its flavor is disappointing, so that in spite of its beauty it is useless as a dessert pear. It has been widely advertised and too highly praised. In some parts it is grown as a cooking pear for home markets. For distant markets it is useless because too tender in flesh.

Origin: On the farm of Mr. Lawson, in New York State, about the year 1800, judging from the appearance of the original tree, which was still standing in the year 1900. Quite recently, it was introduced to the public by Mr. Collins, under the name Comet, because of a fancied resemblance by reason of its bright red color.

Tree: Tender, vigorous; fairly productive; succeeds on the quince.

Fruit: Medium to large; sample photographed 3¼ x 2⅞ inches; obovate, almost pyriform; color yellow, shaded and obscurely streaked with bright red on the sunny sides, with a few small brown dots; stem 1½ inches long, with fleshy protuberance at point of insertion, inclined; calyx half open in a large irregular basin.

Flesh: Color, creamy white, coarse-grained, mealy when ripe, inclined to rot at the core; flavor sweet, fairly good.

Season: August 1st to 10th.

Quality: Dessert, good; cooking, good.

Value: Home market, good; distant market, poor.

Adaptation: Southern parts of the Province.

Section of Lawson

LE CONTE.

Le Conte.

An American pear grown for market in the Southern States. It is not considered profitable in Ontario.

Origin : A Chinese seedling.

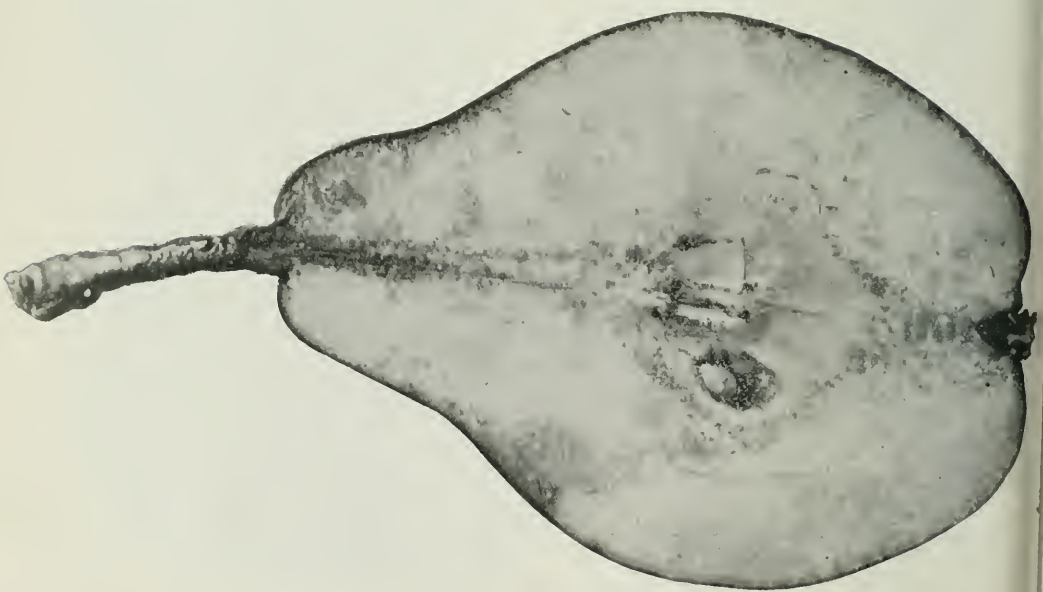
Tree : Vigorous ; productive ; apparently not subject to blight.

Fruit : Large ; form oblong, pyriform, turbinate ; color yellow, often with slight touch of red on sunny side ; skin free from blemishes, and not subject to scab.

Flesh : White ; texture tender ; flavor sweet, perfumed, ordinary.

Quality : Dessert poor ; cooking fair.

Value : Second class for market.



Section of Le Conte.

RITSON.

Ritson.

A delicious dessert pear, which is worthy of a place in every fruit garden; it is not surpassed for canning or for pickling, having an aroma and a peculiarly agreeable flavor.

Origin: Oshawa, Ontario, with Mr. Wellington. In response to our inquiry, Mr. W. E. Wellington writes:—"It was my grandmother who planted the seeds from a pear which had been sent her from Boston. The tree has always stood on my grandfather's homestead as long as I can remember."

Tree: Strong, healthy, upright grower. The original tree is now of immense size, probably over 30 feet high, and about one hundred years old. An annual bearer of nice, evenly formed fruit.

Fruit: Size medium, reaching $2\frac{1}{2}$ x 2; form obovate pyriform, usually one-sided; color of skin yellow, heavily shaded with golden russet, and numerous minute dots of a darker russet; stem one-inch long, often inserted in a fleshy protuberance, and at a slight inclination; calyx open wide in a very shallow, regular basin.

Flesh: Creamy white; texture, fine, tender, buttery, juicy; flavor, sweet, delicately perfumed.

Quality: Dessert, very good to best; cooking, very good.

Value: Market, promising for a special trade.

Season: October.

Section of Ritson.

SOUVENIR.

(Souvenir du Congrés).

A very large, showy pear, but coarse in flesh and of ordinary quality. Single trees are found in many Ontario fruit gardens, but so far we know of no orchards of this variety planted for profit. Hogg, the British pomologist, however, speaks of it more highly, as follows :—"A very handsome and excellent pear ; ripe in the end of August and the beginning of September. It has a great resemblance to the Williams (Bartlett), but is quite a distinct fruit."

Souvenir du Congrés.

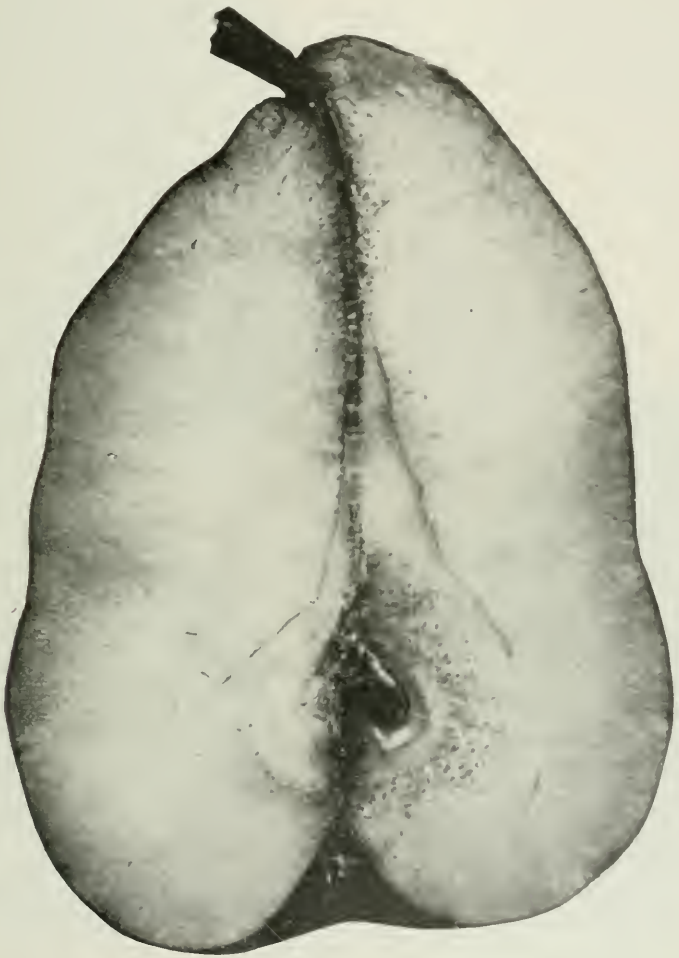
Origin : France, by M. Morel, of Lyon-Vaise, and dedicated to the Pomological Congress of France.

Tree : Vigorous and productive, pyramidal.

SOUVENIR (Souvenir du Congrés).—*Continued.*

Fruit: Very large, section photographed measured 4½ x 3½ inches; form oblong obovate, indulating in outline; color clear yellow ripe, with a red cheek and many brown dots; stem ¾ of an inch long, stout, much inclined, inserted without a cavity; calyx large, open, set in a deep basin.

Flesh: Color white; texture tender, juicy, melting; flavor rich, vinous, aromatic, somewhat resembling that of Bartlett.



Section of Souvenir du Congrés.

Season: Last of September and early October.

Quality: Dessert, fair; cooking, not tested.

Value: Home market, very good; distant market, not tested.

Adaptation: Not widely tested in Ontario.

TYSON.

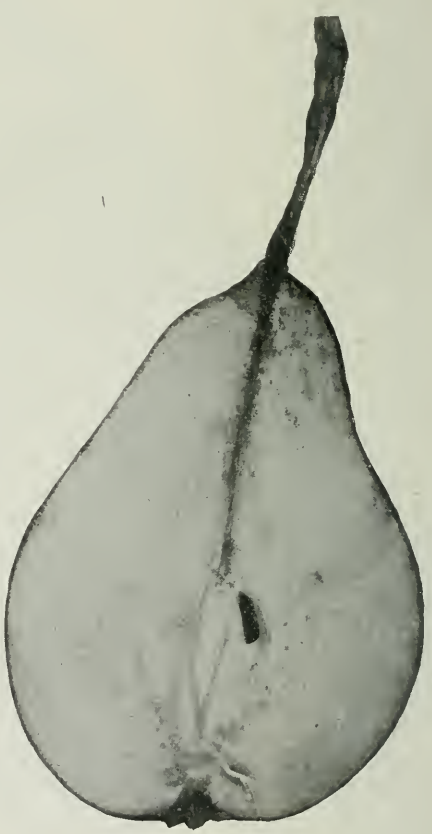
A fine pear yielding enormous crops of medium sized fruit, very good for dessert or cooking; but too near the season of the Bartlett to be profitable for market.

Origin: A native, seedling found in a hedge on the farm of Jonathan Tyson, near Philadelphia.

Tree: Vigorous; upright; very productive. Several old trees at Maplehurst, 40 years planted, have reached an immense size and have never shown the least indication of blight.

Fruit: Size medium; about 2½x2; form acute pyriform; color green, turning yellow when fully ripe, russet about basin, cheek crimson, dots brown, numerous; stem 1¼ inches long more or less, fleshy at base; calyx open.

Tyson.



Section of Tyson.

Flesh: Color white; texture tender, buttery, fine grained, juicy; flavor sweet, aromatic, excellent.

Quality: Dessert, very good; cooking, very good.

Value: Home market, second class.

Season: August 15th to 30th.

DOYENNE.

White Doyenne of Ontario; Virgalieu of New York State.

White Doyenne.

An old variety with many French synonyms, of which the proper one according to LeRoy is La Doyenne. Downing speaks of it as "unquestionably one of the most perfect of autumn pears", and on account of its excellent quality and the productiveness of the tree, it was at one time widely planted in the commercial orchards of Ontario and the United States. Latterly, however, like the Flemish beauty, it has become subject to black spot, for which reason it is losing favor.

Origin: France.

Tree: Healthy, not subject to blight; a fairly vigorous grower, and an abundant bearer; usually grown as a standard.

Fruit: Size medium to large, averaging $2\frac{3}{4}$x$2\frac{1}{2}$ in.; form obovate, variable in length; skin green at first, changing to yellow as it ripens sometimes red in the sun, sprinkled with numerous russet dots; stem $\frac{3}{4}$ of an inch long, set in a shallow cavity; calyx half closed in a shallow slightly plaited basin.

Flesh: White; texture fine grained, buttery, fairly juicy; flavor sugary, aromatic, perfumed.

Season: September and October.

Quality: Dessert, very good; cooking, very good.

Value: Market, second class.

Section of White Doyenne

PLUMS.

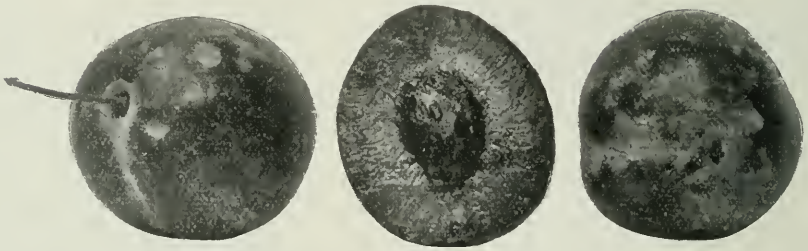
ARCTIC.

The tree is hardy and the fruit is of some value where the better varieties do not succeed. It is very productive, but too small to bring the best prices in the market, especially in view of its ordinary quality.

Origin : Maine.

Tree : Hardy ; fairly vigorous ; productive ; trees at our Lake Huron station, eight years planted, yielded from six to eight baskets each.

Fruit : Size small, $1\frac{1}{2}$ x $1\frac{1}{4}$ inches ; form oval ; color very dark purple, with thin blue bloom ; suture traceable ; stem slender, $\frac{3}{4}$ inch long, set in a small cavity.



Arctic.

Flesh : Color yellowish green ; texture firm, moderately juicy ; flavor moderately sweet ; free stone.

Season : August 15th to September 1st in southern parts of the Province, and early September in more northerly plum districts ; at Lake Huron station it ripened September 4th in 1902.

Quality : Dessert, useless ; cooking, good.

Market Value : Second to third rate.

DUANE.

(Duane's Purple.)

A good commercial plum, double-starred as a profitable variety in the Western States.

Origin: Duanesburgh, N. Y.

Tree: Vigorous, productive.

Fruit: Very large; form oblong, oval, longer on side; color reddish purple with lilac bloom, turning dark blue; stalk slender, ¾ inch long, set in a narrow cavity.

Duane's Purple.

Flesh: Color yellow; texture tender, juicy; flavor moderately sweet and good; partial clingstone.

Season: End of August in Niagara district; at Walkerton reported ripe Sept. 5th in 1901.

Quality: Cooking, good.

Market Value: First class.

GRAND DUKE.

A valuable market plum, on account of its large size and handsome appearance.

Origin: Europe.

Tree: Healthy; moderately vigorous; quite productive.

Fruit: Size large, 2¼ inches long by 1¾ broad; form obovate; color dark blue or black, with dark blue bloom; stem about one inch long, in a small cavity; suture deep.

Grand Duke.

Flesh: Color yellow; texture firm; flavor agreeable; cling.

Value: One of the best late market plums.

Season: Late September.

Adaptation: The southern part of the Province, as far north as Kingston and Collingwood.

GOLD.

A very attractive plum, because of its golden yellow color, but not recommended for the commercial orchard.

Origin: A hybrid of Chickasaw and Japan, originated by H. A. Ferry, of Crescent Iowa.

Tree: A poor grower, but an early and abundant bearer.

Gold.

Fruit: Large roundish; size 1¾ by 2 inches; color golden yellow, with a blush of light red about the stem; stem ¾ of an inch in length; skin tough.

Flesh: Yellow; texture tender and juicy; flavor sweet, aromatic, and pleasant; clingstone.

Season: Last of August.

Quality: Dessert, fair.

Market Value: Fair.

LOMBARD.

One of the most prolific of the old varieties, and, until recently, considered the most profitable. Of late, however, the price of Lombard plums has so far declined that other varieties are being planted in its place.

Origin: Raised from seed by Judge Platt, Whitesboro, N.Y.; introduced to public by M. Lombard, of Springfield, Mass., after whom it was named. Previously it was called Bleeker's Scarlet.

Tree: Very productive; very vigorous; very hardy; inclined to overload, and the fruit needs thinning.

Lombard.

Fruit: Medium size; form roundish, oval, slightly flattened at the ends; color purplish red, paler in shade; bloom heavy; suture traceable; stalk slender, about $\frac{3}{4}$ inch, set in a broad, funnel-shaped cavity; subject to rot when overloaded.

Flesh: Deep yellow; texture firm, juicy; flavor pleasant; cling stone.

Quality: Dessert, good; cooking, very good.

Value: Second rate for market.

Season: Last week in August to first week in September.

HAND.

(General Hand.)

A very fine, large plum of the Gage group, which is worthy of a place in the amateur's garden as a dessert or preserving plum, but not profitable as a market variety.

Origin: On farm of General Hand, Lancaster, Pennsylvania.

Tree: A very vigorous grower, but a shy bearer; class, Domestica.

Hand.

Fruit: Round; size medium to large, sample photographed, 1¾ by 2 inches; skin deep golden yellow, marbled with greenish yellow; stem slender, about an inch long, inserted in a shallow cavity; suture shallow.

Flesh: Color pale yellow; texture coarse, moderately juicy; flavor sweet and very good; free from stone.

Season: September.

Quality: Very good for either dessert or cooking.

Market Value: First class.

Adaptability: Succeeds as far north as Collingwood.

KINGSTON.

A valuable market variety.

Origin: Province of Ontario.

Tree: Vigorous and productive.

Fruit; Size medium to large, $1\frac{5}{8} \times 1\frac{1}{2}$; form oval; color dark purple, with thin blue bloom; stem slender, about $\frac{5}{8}$ of an inch long, inserted in a small, deep cavity; suture shallow; apex a small point.

Kingston.

Flesh: Color yellowish green; flavor tart.

Season: Early September.

Quality: Cooking, very good.

Market Value: First-class.

Adaptation: Since it originated and succeeds well on the north side of Lake Ontario, it promises to be fairly hardy.

QUINCE.

BENTLEY.

A variety grown largely for market in Maryland, and in Ontario it is gaining in favor. The sample photographed was grown on the Maplehurst Experimental Grounds.

Bentley.

Tree : Thrifty ; productive.

Fruit : Large, from 3 to 4 inches in diameter ; form roundish ; skin, yellow with heavy down.

Quality : Excellent.

Market Value : First class.

Season ; Early part of October.

Section of Bentley.

Blackberries grown in young orchard at G. C. Caston s, Craighurst, Ont.

Fruit House of W. H. Dempsey, Trenton, Ont. Capacity about 3,000 barrels of apples.
(Illustrating Prof. Hutt's Report, page 87).

A well kept Keiffer pear orchard, the property of M. Pettit, Winona, Ont

Home of G. C. Caston, Craighurst, Ont.

View in orchard of Harold Jones, Maitland, Ont. Trees on the right killed last winter after heavy crop of previous year. Tree at the left bore no crop last year, and came through the winter uninjured.

Pure-bred Poultry, a profitable side line with A. E. Sherrington, Walkerton, Ont.

Experimental dwarf pear orchard of L. Woolverton, Grimsby, Ont.

Experimental cherry orchard of L. Woolverton, Grimsby, Ont. Eighty varieties under test.

Fruit Experiment Stations.

THE SECRETARY'S REPORT.

By Mr. Linus Woolverton, Grimsby.

During the past nine years the writer has been supervising the work of the stations and the report thereof at a considerable disadvantage, having had in addition the editorship and the business management of the Canadian Horticulturist, and the office of Secretary of the Ontario Fruit Growers' Association.

All these offices he has resigned in order that he may give the time so occupied to the superintendence of the work of the stations, and the study of Pomology, a course of action suggested by the Minister of Agriculture, who is desirous of having a comprehensive edition of the "Fruits of Ontario" ready for publication as soon as possible.

For the study of the fruits under varying conditions the work of the experimenters affords excellent opportunities, but for careful observation of the habits of the trees and for constant and original study of the characteristics of each variety by frequent handling and tasting, the writer has found it necessary to plant these fruits on his own grounds. He has therefore given up about ten acres of his fruit farm for this purpose, and has planted a very large collection of varieties of all kinds of fruit.

The Work of the Fruit Stations.

The following tabular statement shows approximately the number of acres thus far occupied by each experimenter in experimental work, the number of varieties under test, and the special fruits to which he has thus far been asked to devote especial attention.

Name of Station.	Name of Experimenter.	Number of varieties	Number of acres	Specialty.
Wentworth	M. Pettit	200	3	Grapes.
Bay of Quinte	W. H. Dempsey	200	5	Apples
Southwestern	W. W. Hillborn	200*	5	Peaches.
Burlington	A. W. Peart	276	2½	Currants and Blackberries.
Georgian Bay	John Mitchell	313	5	Plums.
Simcoe	G. C. Caston	220	5	Hardy Apples and Hardy Cherries.
Lake Huron	A. E. Sherrington	200	4	Raspberries.
St. Lawrence	Harold Jones	200	5	Hardy Plums and Hardy Pears.
Maplehurst	L. Woolverton	700	10	General Collection.
Strawberry Station	E. B. Stevenson	150	1	Strawberries.
Algoma	Chas. Young	130	3	Hardy Fruits.
Wabigoon	A. E. Annis	.....	.....	" "
†New Ontario	.....	.....	.....	" "
		2,789	48½	

*Mr. Hilborn's collection of varieties for test was destroyed by frost in the unusually severe winter of 1903-4.

†Collections of hardy fruits have been sent to several settlers about New Liskeard, but no one has yet been definitely appointed experimenter.

This table shows a total of 2,789 varieties of fruit, occupying over 48 acres of land, attended to by 12 different managers, each a specialist in the particular fruit placed in his charge, and all operated for the modest sum allowed for their work of about $1,800, or an average of about $150 per annum each.

Meetings of the Board of Control.

During the year 1904 two important changes have been made in the membership of the Board of Control, (1) in the retirement from the Chairmanship of Dr. Jas. Mills, who as President of the Ontario Agricultural College, has occupied the position, *ex officio*, ever since the inception of our work, and the succession to this position of G. C. Creelman, B.S.A.; and (2) in the addition to the Board of Mr. P. W. Hodgetts, the newly appointed Secretary of the Ontario Fruit Growers' Association, who as such is also an *ex officio* member.

Three meetings have been held during the year, the first in the Parliament Buildings, Toronto, on Wednesday, 6th January, 1904; the second at the Ontario Agricultural College, Guelph, on the 2nd of August; the third at the Walker House, Toronto, on the 14th of November; and the fourth at the Ontario Agricultural College, Guelph, on the 2nd and 3rd of December.

Among other important actions of the Board during the year we note the following:

(1) An order that three of the best American, and three of the best English varieties of gooseberries be tested at the Burlington, Lake Huron, and Algoma stations.

(2) An order that six varieties of Japanese chestnuts secured from Mr. Burrill's station at St. Catharines, be sent to the southwestern station and to the Secretary for testing.

(3) An order for the importation of three each of the newest and best varieties of cherries and peaches from England, the latter to be tested at the southwestern station, and the former by the Secretary.

(4) An order for the sending of a collection of small fruit bushes, and a few hardy fruit trees, to reliable persons in New Ontario, on condition that they report fully upon them to the Secretary.

(5) Arranging for an annual public meeting of the experimenters to occupy one whole day, when discussions upon varieties and their adaptation are to be a leading feature, and an opportunity given the public for asking questions.

(6) Arranging for the attendance of the experimenters at the annual meeting of the Ontario Fruit Growers' Association.

(7) Arranging for an exhibit at the Industrial Fair in 1905, of those commercial varieties of fruits recommended by this Board, with explanatory placards, of injurious insects and fungi, etc., from such sources as may be most convenient, under the supervision of Mr. Percy W. Hodgetts.

(8) Arranging for an educational exhibit of fruits, with the desirable varieties shown in quantity, at the Winter Fruit, Flower and Honey Show, Toronto, in 1905, under the superintendence of the Secretary.

(9) Ordering that experiments be conducted at the southwestern station for the winter protection of peach trees, and that for this purpose he be furnished with enough trees of the most desirable commercial varieties to set an orchard of four or five acres, of which trees at least 10 per cent. are to be those budded on plum stock.

(10) Planning that more extended tests of the adaptation of valuable varieties of fruits to various parts of Ontario be undertaken by our stations.

(11) Preparing lists of desirable varieties of the various fruits for the different sections of the Province.

(12) Publishing from time to time, lists of varieties tested at the various stations and found undesirable in the districts represented.

(13) The revision by the Secretary of the Catalogue of Fruits, for guidance of Planters, subject to the approval of the Board.

(14) Ordering the early publication of the first edition of the work by the Secretary, L. Woolverton, entitled "Fruits of Ontario," to include in alphabetical order all the descriptions of fruits made by him during the past nine years, with the original photogravures representing the same, together with as many additional ones as he can add during the year in order that the work may be as complete a book of reference for fruit growers as possible.

Inspection of Stations.

The purposes of the visits of inspection to the various fruit stations by the Secretary are (1) to gather details concerning the behavior of the various fruits in different localities for use in his report, more especially, for the revision of his work descriptive of the fruits of Ontario; and (2) to gather such information concerning varieties tested as may be a guide to this Board in their future action especially as regards the further testing of them at other stations, in order to prove their adaptation to the various fruit districts of our Province.

Burlington Station.

I visited this station last August in blackberry season, in order to study the varieties and take photographs of them for use in Fruits of Ontario. Other years I have visited it in the currant season and in the pear season.

I find that nearly all the tests made at this station regarding the merits of the many varieties of blackberries and currants have been made from six plants only of each variety. Now this was no doubt sufficient to accomplish the object in mind of the Board at the time when these plants were sent to this station, viz.: (1) to test the identity of varieties and (2) to gain some idea of their form, size, quality and other characteristics; thus proving their real value or their worthlessness. This is most desirable work because it enables us to warn the public against worthless kinds and to give lists of those which have promise.

Such tests as these however do not go far enough. The public wish further to know whether a variety is profitable, and if so in what localities and in what soils it will prove successful. To do this we ought first to ask the experimenter to make a small commercial plantation of three or four of the most promising varieties judged from their past behavior at his station; and, second, we must ask those experimenters differently situated to test these same varieties in a commercial way also, keeping a careful account of the average yield of say 50 plants of each kind; the number of fruits to a basket or to a pound; the season of gathering; the selling price of each, etc.

St. Lawrence Station.

Early last November, about the close of the apple season, I visited the St. Lawrence and the Bay of Quinte stations. At the former Mr. Jones

showed me over his five acre experimental plot, with its large, but most disappointing collection of plums, apples, pears, cherries and small fruits. Of the plums tested, some were tender in tree, others only in fruit buds. The Americana varieties alone gave any promise, and of these only one, the Whittaker, gave indications of proving to be a good cropper; but, even so, it is yet a question whether these natives will sell in the markets for enough money to make them profitable.

In apples Mr. Jones has yet to find a variety that is more profitable to grow for market than the old Fameuse, top-grafted on McMahon White. Scarlet Pippin, McIntosh and Wealthy are all profitable, but not equal to the first mentioned.

In pears no variety, out of the large collection sent him, has proved hardy except Bessemianka and Flemish Beauty, and the former is worthless for market.

In cherries, out of a large number tested, only one has borne fruit in any quantity, and unfortunately the label is lost, but it was evidently one of the pie cherry class.

Altogether this five acre experimental plot, while of the utmost value in guarding would-be fruit growers along the St. Lawrence river from planting varieties of fruit which are certain to prove a failure, has been a bill of expense to Mr. Jones, without any returns in fruit sales to lessen its extent; so that, even with the allowance made for his work, his experimental plot has proven to be the least profitable part of his farm.

In my opinion this St. Lawrence station can be made of still greater value in the future than in the past to the St. Lawrence district by planting a few of the tested kinds in large enough quantity to prove their value in a commercial way, a work which can never be accomplished by planting two or three trees of a kind.

I would suggest that the Board furnish this station with at least twenty trees each of three or four of such varieties of the Pie cherry class as have proved the most productive with your Secretary; with 20 trees of the Whittaker plum, and with such other fruits as should be tested for hardiness in the St. Lawrence district. Further that Mr. Jones be asked to continue his experiments with hardy stocks of apples, pears and plums, upon which to top graft varieties which promise to succeed in his district.

Mr. Jones pointed out to me a ridge of sandy soil on his farm, sloping toward the south, which ought to prove better adapted to cherry growing than the clay loam upon which he has so far been making his tests, and which he would be willing to set aside for our work for a proper consideration.

Bay of Quinte Station.

At the Bay of Quinte station Mr. Walter Dempsey accompanied me through his immense apple orchard and pointed out to me a large number of trees which had been top grafted with varieties sent him for test by your Board. The larger part of these still remained ungathered upon the trees, partly because there were too few of any one kind to fill a package, and partly because so few of them appear to have any real value compared with varieties already grown. I have asked Mr. Dempsey to make out a list of varieties fully proven to be undesirable for any purpose, or for any locality, so that I

may lay it before this Board. I would suggest that such varieties be entered in our permanent catalogue as undesirable so that they may be referred to when enquired about, and not be reported upon any further.

A few, however, of the newer varieties sent him give promise of being valuable, and I think these should be tested upon a larger scale. If properly compensated I think Mr. Dempsey would top graft the whole top of a twenty-five year old tree, to each of the promising newer varieties, and by this means he would in a short time have a sufficient quantity of each of these to test them in the markets, as well as to note their productiveness, and thus be the better able to judge of their commercial value.

Wentworth Station.

During the grape season I have several times in the last few years visited our Wentworth station, where Mr. Pettit has a very large collection of grapes. Many of the varieties he has already reported upon as being worthless, and these we may dispose of by inserting them in our permanent reference catalogue for the information of enquirers, and not report upon them any further. A few, however, are very promising, and these ought to be tested upon a larger scale to know whether they have any commercial value. I would suggest that at least ten vines of each of these be furnished Mr. Pettit, so that he may have fruit enough to ship to market along with the older kinds, and thus be in a position to report to us upon their real commercial value.

Future Work.

What I have advised regarding the above four stations may of course be extended to all of them, but this is only preliminary work. Immediately we have proved that a variety has absolute value at any one station, the important problem still remains to be solved of ascertaining to which portions of our Province it is best adapted and to which it is unsuited for cultivation. This work we have not yet begun to do to any extent; indeed it is only now that we are in a position to undertake it.

I would suggest that the Board of Control make a list of the varieties that have been proved to have real value at any one station, and then make arrangements to have these tested at all those stations at which there is the least hope of their proving a success; and, if the stations already open are not sufficiently distributed to accomplish this work, I would suggest that a few others be opened for the purpose.

With regard to the testing of new varieties of peaches, pears and tender fruits, your secretary has already planted these for purposes of study in describing fruits, without any cost to the Board except the cost of the trees, so that it will not be necessary to establish any stations to duplicate this work. He will make full reports upon them to this Board if desirable. The new stations would be wholly for the work of testing the adaptation to various districts of those varieties whose merits are fully proven.

Experimental Fruit Exhibit at the Fruit, Flower and Honey Show, 1904.

The object of making exhibits of fruits from our stations is educational. The Board has thought it wise to show the public samples of new varieties under test which are being referred to in the annual report; also to show

collections of old varieties, correctly named, grown at the fruit stations in different parts of the Province in order to compare their merits, and to correct the nomenclature. A further object is to separate profitable from unprofitable varieties, in order that intending fruit growers may take lists of kinds for planting and be warned against those which are undesirable.

In accordance with an order from this Board, the experimenters were asked to exhibit only the most desirable varieties in their collections at the Industrial Fair, so that the exhibit there was this year very much curtailed. The principal exhibit from our stations was made at the Fruit, Flower, and Honey Show, in the Granite Rinks, Toronto, from the 15th to the 19th of November. The experimenters were asked by your secretary to separate the desirable from the undesirable varieties, in order that the exhibit might be of the greater service. The central trophy in the hall was placed at our disposal, together with several tables near it, all of which were well filled with our exhibits. Large signs were painted and set up over them, in order to draw pubic attention to our exhibit as distinct from the exhibits which were entered for prizes.

On one side of the central trophy was the exhibit from the Lake Huron station, which included 45 bottles of fruit containing raspberries, blackberries, strawberries, etc., which could not be shown fresh; and 28 varieties of apples, all of which were most creditable. Among the latter the more important were Ontario, Wealthy, Spy, Tolman, King, Baldwin, Cranberry, N. W. Greening, Ben Davis, Greening, Mann, Snow, Peter, etc.

On another side was the exhibit from the Burlington station, containing about thirty bottles of blackberries and currants, and 28 plates of apples and pears. On this trophy were also a collection of apples and pears sent in by L. Woolverton, Grimsby, among them the Pitmaston pear, a variety which is to be sent out to all the stations for a thorough test as to its adaptation to the various fruit districts. Also there was a box of the Princess Louise apple, which at the request of Mr. McNeill, the chief of the Fruit Division, was forwarded to Her Royal Highness, the Princess Louise, through Mr. W. A. McKinnon, our commercial agents at Bristol. Some Japan walnuts and some Japan chestnuts were placed on the table by Mr. A. M. Smith of St. Catharines.

On another table were shown the exhibits from the St. Lawrence and the Simcoe stations. The former showed 14 varieties of apples, among which the more prominent were the three pyramids of each of three famous dessert apples, viz.: Fameuse, Scarlet Pippin, and McIntosh Red. Among the other varieties which were shown in smaller quantities were Stark, Blue Pearmain, Milwaukee, Wolf River, Scott's Winter, Canada Red, Baxter, Canada Baldwin, Golden Russet, Tolman and Haas.

The Simcoe station showed 30 varieties of apples, among which were the Boiken, Peerless, Bottle Greening, Pewaukee, King, Bogdanoff, Baxter, Romanskoe, Shiawassie, Hamilton, Wolf River, Bismarck, and Gano, besides many well known kinds.

The apple exhibit by the Bay of Quinte station was a large one of more than 100 varieties. One table was filled with kinds which had proven themselves unprofitable, and these made about 9-10 of the whole number. On the other table were pyramids of the profitable varieties, so arranged as to catch the eye in passing. Among these were included Fallawater, Seek, Cranberry, Wealthy, Golden Russet, Ontario, Hubbardston, Ribston, Spy, Snow, Alexander, McIntosh, Baldwin, Ben Davis, Stark, King, Greening, Baldwin and Scarlet Pippin.

The Wentworth station showed a fine collection of grapes, but of the 127 varieties shown only about a dozen were set one side as being the most desirable to plant for profit, viz.: Black, Campbell, Moore, Worden, Concord and Wilder; White, Niagara and Diamond; Red, Lindley, Agawam, Delaware, Vergennes and Catawba.

The Algoma station sent down a collection of varieties of apples which had proved hardy on St. Joseph's Island, among which were the Duchess, Longfield, Wolf River, Alexander.

Another year I would suggest that each experimenter be asked to show the most desirable kinds in bulk, so as to form large pyramids, while those which are promising or not fully tested may be shown in small lots about them; and the condemned varieties on separate tables. I would also suggest that the apple experimenters be asked to show separate groups of five varieties more or less each of cooking and of dessert apples so selected as to cover the whole apple season.

The Central Experimental Farm also contributed very materially to the interest and importance of our exhibit by showing a very large collection of interesting varieties mostly new, which are being tested at Ottawa. Wealthy, McIntosh and McMahon White were shown in large pyramids, and the others in smaller lots.

At the close of the show all this fruit was handed over to the Ontario Fruit Growers' Association to be sold toward paying the expenses of the Fair.

Financial Statement for 1904.

Experimenters' salaries	$ 1,812 50
Secretary and Author of Fruits of Ontario	725 00
Inspectors' services	100 00
Fruit exhibits	234 48
Board meetings	172 35
Travelling expenses, Secretary and Inspectors	133 89
Experimenters' expenses to F. G. A. meeting at Leamington	62 20
Photographs of fruit	56 77
Arndt Tree Protectors	48 00
Stock for stations	66 54
Freight, express and duty	18 16
Postage	11 50
Stationery	6 32
Committees	6 35
Reporting Pomological Meeting of Experimenters	10 00
Bottles for showing fruit	55 28
Advertising	90 00
	$ 3,609 34

The foregoing statement shows that the Board of Control has managed the grant at their disposal with the greatest care and economy, considering the amount of work accomplished.

Very little money was expended in purchasing stock in the spring of 1904, but in future this expenditure must be increased, because of the necessity of testing the best things at all stations in order to test their adaptability; and, especially, in the spring of 1905, because of the severe winter

of 1903-4, which has totally destroyed all the 237 varieties of fruits under test at our southwestern station. The intention of the Board is to plant at least five acres of the leading commercial varieties of peaches at this station, and ask Mr. W. W. Hilborn to experiment with various means of winter protection.

Pomological Meeting.

Believing that a discussion of varieties by a meeting of our experimenters, who are each experts in some particular fruit, would be profitable, the writer arranged for a public meeting at Toronto during the week of the Provincial Winter Fruit, Flower and Honey Show. This meeting was held in the Member's Parlor, in the Parliament Buildings, and was reported verbatim for this report. The discussion elicited so much interest that the Board has ordered that next year one whole day be given for this work.

The Reports by the Experimenters.

These reports form a large and a very important part of this volume. To some readers it may seem contradictory where the same fruit is highly commended in one report and condemned in another, and we desire, therefore, to explain that the difference in meteorological and soil conditions is so great that by it all these apparent contradictions are fully explained; thus Scott's Winter and Longfield apples are much valued in the northern apple districts, but are omitted entirely from lists prepared for southern districts.

Similar differences may be noticed in the remarks about pruning, those in the south advocating heroic treatment, while those in northerly districts advise as litle pruning as possible. No doubt that trees grow rapidly, as they do in the Niagara district, neglect of thorough pruning would soon lead to such dense heads that no fruit would be produced, while in the Ottawa Valley, where the growth is slower, very little pruning would be necessary.

It will be observed that the reports are so arranged that the various fruits are mentioned in alphabetical order, and that the varieties of each fruit are also arranged in the same manner. By this means, all the information gathered during the year about a certain variety may be at once turned up by the reader, without the need of an index.

FRUITS RECOMMENDED FOR PLANTING IN VARIOUS PARTS OF THE PROVINCE OF ONTARIO.*

The Board of Control recognizing the great disadvantage which faces inexperienced persons who desire to engage in fruit growing for profit, because of the very large and confusing list of varieties, has ordered the publication of select lists of tested varieties which shall serve as a guide to intending planters.

It is not claimed for these lists that the varieties named are the only valuable ones, or that they are in any way complete. We hope year by year to be able to add to these lists other valuable kinds, some of which may replace those now appearing.

We also hope in time to be able to publish more complete lists of fruits adapted to the various localities of the Province, as well as lists of those found unsuited, thus preventing much loss to individual planters who might otherwise be persuaded to plant fruits too tender, or otherwise unsuited to their respective localities.

*These lists will be varied and extended in our future reports.—Secretary.

APPLES.

List of the Most Valuable Varieties for Market.

Summer.

Red Astrachan: Adapted to all sections except the extreme north.
Duchess: Adapted to all sections.

Fall.

Gravenstein: Adapted to all sections except the St. Lawrence River district and other northerly portions of the Province.
Wealthy: Particularly valuable for northern sections.
Alexander: For northern sections.
McIntosh: Adapted especially to the St. Lawrence River district, but can be grown over a much wider area.
Fameuse: Adapted especially to the St. Lawrence River district, but succeeds well over a much wider area.
Blenheim: Adapted to all sections except the St. Lawrence River district and other northerly portions of the Province.

Winter.

King: Adapted only to the best apple sections, and succeeds best when top grafted on hardy stocks.
Hubbardston: Adapted to the best apple sections.
Greening: Adapted to the best apple sections.
Cranberry: Requires good soil and is adapted to the best apple districts, but especially southern Ontario.
Baldwin: Succeeds best on clay land, and is adapted to the best apple districts.
Northern Spy: Adapted to the best apple districts, but can be grown with success further north by top grafting on hardy stocks. This is also a good method of bringing it into early bearing.
Ontario: An early an abundant bearer, but short lived. Recommended as a filler among long lived trees. Adapted to same districts as Northern Spy, which it somewhat resembles.
Stark: Adapted to best apple districts.

Varieties Especially Adapted to Home Use.

Summer.

Yellow Transparent: Adapted to all sections.
Primate: Adapted to best apple sections.
Sweet Bough: Adapted to best apple sections.
Duchess: Adapted to all sections.

Fall.

Chenango: Adapted to best apple sections.
Gravenstein: Adapted to best apple sections.
Wealthy: Especially adapted to northern sections.
McIntosh: Especially adapted to northern sections.
Fameuse: Especially adapted to northern sections.
Blenheim: Adapted to best apple sections.

Winter.

King: Adapted to best apple sections. Should be top grafted.

Wagener: Adapted to best apple sections.

Swayzie Pomme Grise: Adapted to all sections except most northerly.

Greening: Adapted to best apple districts.

Tolman Sweet: Adapted to best apple districts.

Northern Spy: Adapted to best apple districts, but will succeed further north if top grafted.

Mann: Adapted to best apple districts, but will succeed further north if top grafted.

Hardy Varieties Recommended for Sections North of Latitude 46 Degrees.

Summer.

Yellow Transparent, Charlamoff.

Fall and Winter.

Duchess, Wealthy, Hibernal, Longfield, Patten's Greening, Whitney, Hyslop, Scott's Winter, (Macoun).

Winter.

King: Adapted to best apple sections. Should be top grafted.

Wagener: Adapted to best apple sections.

Swayzie Pomme Grise: Adapted to all sections except the most northerly.

Greening: Adapted to best apple districts.

Talman Sweet: Adapted to best apple districts.

Northern Spy: Adapted to best apple districts, but will succeed further north if top grafted on hardy stock.

Mann: Adapted to best apple districts, but will succeed further north if top grafted on hardy stock.

Recommended for Simcoe County.

Fall: Alexander, Wolf, Peerless, Blenheim.

Winter: Spy, Baldwin, Greening, King, top grafted on hardy stock; Gano, Stark, Fallawater, Pewaukee, Ontario. (Caston.)

A List for Profit along the St. Lawrence River.

Fameuse, McIntosh and Scarlet Pippin. (Jones).

Recommended for Home Uses along St. Lawrence River.

Transparent, Astrachan, Duchess, Alexander, Fameuse, McIntosh, Scarlet Pippin, Wealthy, Milwaukee, Scott's Winter. (Jones).

PEACHES.

A List for Profit, Intended to Cover the Season, Named in Order of Ripening.

Sneed, Alexander, Greensboro, St. John, Champion, Early Crawford, New Prolific, Elberta, Engol Mammoth, Stevens, Longhurst, Smock. (Woolverton).

PEARS.

A list* of varieties for profit, for planting on north shore of Lake Erie and Ontario, and on south shore of Georgian Bay and the country between, named in order of ripening:

Chambers, Giffard, Clapps' Favorite, Bartlett, Hoosic, Hardy, Bosc, Louise, Duchess, Pitmaston, Anjou, Easter. (Woolverton).

PLUMS.

A Select List for Profit.

Red June, Bradshaw, Yellow Egg, Burbank, Satsuma, Chabot, Lombard, Quackenbos, Grand Duke, Reine Claude, Monarch. (Woolverton.)

A List Recommended for Home Gardens in the St. Lawrence District, No Variety being Worth Planting for Profit.

European: Gueii, Glass, Lombard, Shipper's Pride.
Japan: Maru, Ogon, Red June, Burbank.
American: Milton, Whittaker, Hammer. (Jones).

DESIRABLE PLUMS, (H. L. Hutt.)

A few of the leading varieties of European Plums, named in their order of ripening: 1. Bradshaw, 2. Imperial Gage, 3. Gueii, 4. Shipper's Pride, 5. Lombard, (liable to over bear, requires thinning); 6. Quackenboss, 7. Yellow Egg, 8. Grand Duke, 9. Coe's Golden Drop, 10. Reine Claude, (one of the best for canning.)

A few of the best Japanese Plums in order of ripening. These are apparently quite as hardy as the European varieties: 1. Red June, 2. Abundance, 3. Burbank, 4. Chabot, 5. Satsuma, (red fleshed, desirable for canning.)

A few of the best American Plums in order of ripening. These are extremely hardy, and are desirable where the European and Japanese varieties cannot be grown: 1. Atkin, 2. Cheney, 3. Bixby, 4. Mankata, 5. Wolf, 6. Hawkeye, 7. Stoddard.

CHERRIES.

Varieties recommended for the Niagara peninsula, to cover the season, named in order of ripening.

For Profit.

Governor Wood, Knight, Napoleon, Orel, Early Richmond, Montmorency, Late Duke, Windsor, English Morello.

For Dessert.

Cleveland, Knight, Elton, Black Tartarian, Hortense, Choisy, Black Eagle.

*For sections farther north the Flemish Beauty is about the only variety that can be recommended as sufficiently hardy and at the same time of good quality. (L. W.)

For Northern Sections.

Orel, Early Richmond, Montmorency, Russian 207, Koslov, English Morello. (Woolverton).

For Simcoe County.

Orel, Ostheim, Russian 207, Bessarabian, Dyehouse, English Morello. (Caston).

GRAPES.

*Varieties for Profit in the Niagara District.

Black: Concord, Worden, Campbell.
White: Niagara, Diamond.
Red: Delaware, Lindley, Agawam, Catawba, Vergennes. (Pettit).

RASPBERRIES.

For Profit in Lake Huron District.

Early: Marlboro, Turner, Reliance.
Medium to late: Cuthbert, Phoenix and Loudon. (A. E. Sherrington).

BLACKBERRIES.

For Profit.

In Peach Sections: Kittatinny, Ancient Briton, El Dorado, Agawam.
In Colder Sections: Snyder, El Dorado, Taylor, Ohmer, Agawam. (Woolverton).

CURRANTS.

For Profit.

Burlington District.

Red: Wilder, Cherry, Pomona.
Black: Saunders, Naples.
White: Grape, Imperial. (Peart).

STRAWBERRIES.

For Profit; to Cover the Season.

Earliest: Success or Monitor, where Michel or Van Deman do not succeed.
Mid-Season: Tennessee Prolific or Splendid; Sample, Williams or Lyon.
Late: Aroma, Gandy or Joe, Nettie. (Stevenson).

*Where the soil and location is favorable for early ripening I would add Champion and Catawba to the list, but would plant a larger proportion of Niagara and Concord than any other. (Pettit.)

FIRST POMOLOGICAL MEETING.

After corresponding with Mr. G. C. Creelman, Chairman of the Board of Control, the Secretary called a public meeting of the experimenters in the Members' Parlor, Parliament Buildings, on Thursday evening, the 18th of November, 1904, during the week of the Fruit, Flower and Honey Show.

The object of this meeting was (1) to have the experience of the specialists in each fruit, supplemented by that of experimenters from different parts; (2) to give the public an opportunity of asking questions about varieties of fruits, and (3) to supplement and enrich the Report of the Fruit Stations by the interesting and valuable matter thus obtained.

CHAIRMAN'S ADDRESS.

By G. C. Creelman, President O.A.C., Guelph.

As I have now assumed the responsible position of Chairman of the Board of Control of the Fruit Experiment Stations, there are two or three matters connected with the work to which I should like to draw the attention of the experimenters. These stations have now been in existence for nine years, and in one or two respects a crisis has been reached in connection with the work. This work has increased more rapidly than have the funds available for it. Each experimenter has more to do and has greater responsibility than formerly, and I think that the time has come when the remuneration will have to be increased. There has been some dissatisfaction expressed and some have talked of giving up the work. I hope that some arrangement can be made that will cause them to reconsider this, because the work is of the greatest importance to the Province. The people are just beginning to realize the advantages to be gained by having an accurate knowledge of the varieties of fruit best suited to their respective districts. The time has come for us to broaden our work, and test at the different stations those varieties which have given the best satisfaction at each individual station. The time has come for a weeding out process. Many of you have been testing varieties which you knew all along were of no value to your district. These should be discarded, and varieties introduced in their place which have been tested sufficiently to warrant the belief that they may prove desirable in your section also. This will simplify the work, and enable us to start the next decade on a much better basis. I think that the Board should meet again at an early date and discuss these matters. If we can obtain more funds to extend our work still further, well and good; if not, we must make the best use of what we have.

Mr. Morris: I think our initial mistake was in furnishing young stock to the Experiment Stations. If scions had been supplied for grafting on older trees, results would have been obtained much sooner.

Q. You are thinking of apples?

Mr. Morris: Yes, and pears. Instead of planting more trees, the varieties to be tested should be grafted on the trees the experimenters already have in the orchard.

Apples.

W. H. Dempsey, Trenton: There are very few new varieties of apples that, so far as my experience goes, I would care to recommend in preference to the older varieties, and I have tested them very carefully. Hence

my commercial list is practically the same as I have been giving for a number of years. In selecting varieties, the object aimed at should be to have a succession of apples to ship all through the apple season. My list starts with Duchess; second, Gravenstein.

Q. Would not Alexander come before Gravenstein?

Mr. DEMPSEY: What trees I have had of Gravenstein have done remarkably well, but it is a variety that has been neglected in our district. Then would follow Alexander, and after that Trenton. The Trenton was a production of my father's and is a cross between a Spy and a Russet. It has done well with me on light soil. It is a good size, attractive in color, and brings high prices in Glasgow and Liverpool.

Then follow Wealthy and McIntosh Red. The latter is not a heavy cropper, but has about the same quantity of fruit each year. Then comes Blenheim, a variety that yields heavily every alternate year. The Blenheim seems partial to certain small localities. Where it does well, it is very profitable. Then Greening, and where you have lots of space, King, as it is large and sells well. The Ontario bears exceedingly well with me and is large.

Q. Is it more uniform in size than the Spy?

Mr. DEMPSEY: Yes, more evenly large, and it is a heavy cropper every alternate year.

Q. Is it not tender to handle?

A. It requires careful handling, but all apples require that. So far as handling is concerned, I do not think it makes any difference whether they are tender or tough.

A MEMBER: It makes some difference when you come to pack them. Some apples will stand the pressure in the barrel better, such as the Baldwin, and look better when they get to market than others. I do not know the Ontario very well. Does it turn black like the Spy when bruised?

Mr. DEMPSEY: Yes, the bruised spots become dark.

A. Does it take as high a color as the Spy?

A. Fully as high with me; I have very few green Ontarios.

Q. What is its habit of growth?

Mr. DEMPSEY: It grows very rapidly at first, and does not occupy as much space when it begins to bear as the Spy. It is a stronger grower than Wagener and makes a larger tree.

Q. It does not seem to stand the winter as well as Spy?

A. Just as well with me. Last winter was a very severe winter. Not far from me Talmans were killed by frost, but I had no trees killed in my orchard.

Q. I lost a number of young Ontarios last winter.

Mr. DEMPSEY: The next variety on my list is Nonesuch. It is a very profitable apple on higher ground in limestone gravel, producing a good crop of apples of good size and color, where others would be very small. Next come Spy and Ben Davis.

Q. You did not mention the Ribston Pippin?

A. It is a light bearer, but is a fine apple.

Q. It makes more money than any other in the Burlington district. I have one lot of trees 13 years old, another lot 18 years, and a third lot of much older trees.

L. WOOLVERTON: I have an old orchard of them, and find that the trees decay much earlier than other varieties.

Mr. DEMPSEY: The Ontario will not stand rough pruning; it should be left more to itself. I fully agree with Mr. Macoun's ideas of pruning—

the outside limbs should be thinned considerably, and not as much cut from the inside.

In amateur varieties, there is nothing that will give better satisfaction than the Benoni and Primate. The latter is an excellent cooker. Then come Garden Gem and Parlin's Beauty, two new varieties. Then Cox Orange Pippin, one of the best dessert varieties I know. It comes in in October and November.

Q. Is it better than Benoni?

A. Yes, better in quality. I like it better than Fameuse or McIntosh, but it is a tender variety and a slow grower, as it kills back. Next come Banana and Boyd, and for late varieties for amateurs, there is nothing better than Swayzie Pomme Grise.

Q. What about the Yellow Bellflower?

A. I do not think I would include it. I would not plant it myself, but I am aware that it takes well in some of the western American markets, which we have not been in the habit of supplying.

Q. Is Cox's Orange liable to spot?

A. I do not remember seeing spot on it.

HAROLD JONES, Maitland: The Duchess does well with us. In the Ottawa valley and the lower St. Lawrence valley it is classed as an early fall apple, whereas in Central Ontario it is apparently classed as a summer apple. It is not really ripe with us until the middle of September.

Q. It would come in with the Wealthy then?

A. No; Wealthy is later than that. Varieties such as Astrachan and Yellow Transparent are our summer apples. Next in order of ripening, come St. Lawrence and Alexander, then Wealthy.

Q. Do you recommend St. Lawrence?

A. Taking an average for a period of ten years, it has not proved satisfactory in the markets. It is a good showy apple, but at times the demand for it seems almost to cease.

Q. You do not advise planting it, then?

A. No; I do not.

Q. Have you ever exported it?

A. No; I have had very little experience in exporting.

Q. What time do you gather?

A. About the end of September, and the fruit will keep nicely for three weeks. Alexander is a good apple and a good seller; .
It has a good reputation as an export apple.

Q. For how long can you keep it in fair condition after gathering?

A. Until the middle of October.

Mr. DEMPSEY: It has given me good returns also.

Mr. JONES: It is perfectly hardy, and I have never heard any complaints of winter injury. It is a fair bearer. The fruit is sometimes attacked by rot on the tree, but not seriously.

Q. Do you find that on older trees?

Mr. JONES: No, on young trees. I have trees bearing from 6 to 22 years planted. Just individual specimens will rot. I have sprayed regularly, and have never met with any serious loss, although I have known of those who have.

Q. Is it not subject to scab?

A. Not with me.

Mr. SHERRINGTON: It is in our section even when sprayed.

Mr. DEMPSEY: I have a few trees, and where not sprayed they crack and rot

Q. Do you prefer the Wolf River to Alexander?

A. It has not been bearing long enough with me to form an opinion.

A MEMBER: The Wolf River will keep till Christmas and Alexander will not.

Mr. JONES: Following the Alexander and Wolf River, we come to Wealthy. Our Wealthy is not quite equal to that of the Ottawa Valley. I have watched Wealthy in the St. Lawrence valley for five or six years, and it does not grow to the same perfection either as to color or size that it does in the Ottawa Valley. It has evidently found its home in the Ottawa valley, although it is an admirable apple with us.

Mr. WOOLVERTON: Mr. Wright, of Renfrew, has grown some of the finest Wealthys I have ever seen.

Mr. JONES: All will acknowledge that some varieties will do better in one locality than in another. In the St. Lawrence Valley, the Fameuse is the best commercial variety. It used to be supposed that it could not be kept free from spot, and although it is difficult some years, I have never yet failed to accomplish it. It is a clean apple if it is sprayed and taken intelligent care of. The Fameuse, McIntosh and Scarlet Pippin belong to the one group or family, and all are peculiarly adapted to our section. It is only in minor points that one is superior to the other. Of the three the Fameuse bears the largest crops of fair sized fruit. All are subject to spot, but can be kept free by spraying. All are fancy apples and take well on the market, and bring top price in their season. Scarlet Pippin is rather inclined to run small as the trees age, but with me they have never run so small as to be unmarketable. McIntosh Red is the largest of the three and the most attractive in color, but does not ship as well as either of the others. It is distinctly a box apple. and could be wrapped to advantage. In that way you will get the greatest benefit out of a good article. I do not know whether it is the fault of the packers or the fault of the fruit, but there is more complaint of injury to these apples when packed in barrels than in the case of any other variety. It has been bringing from twenty-five to thirty-five cents per barrel more than Fameuse or Scarlet Pippin during the last three years. I put up a box on October 12, and opened it yesterday in perfect condition. The fruit was wrapped.

Mr. MACOUN: I got ten barrels from Mr. Harkness, of Irena, a few weeks ago. They were taken to the station, four or five miles, and then shipped fifty miles by train to Ottawa, and afterwards delivered at the farm. They opened up practically without a bruise; but they were well packed. They bruise easier than Fameuse, but if carefully packed, they will stand shipping in barrels for short distances.

Mr JONES: I think it is just as well to emphasize the difficulties so that they may be taken into consideration. Mr. Dempsey mentioned Blenheim Orange as valuable in Trenton. It is tender with us, and so is Greening. King is tender in the bud. I planted three trees of Ontario in 1896, and as I rather liked the character of the tree and the appearance of Mr. Dempsey's orchard, I planted 165 trees. They are all dead now and cut down. We have a few Ontario scions four years old on Pewaukee stock alive, but they were injured last winter, so that the Ontario must be classed as tender in our section. The Spy top-grafted does fairly well, but the fruit bud is uncertain. The Ribston Pippin is a light bearer and tender in bud. We have no winter apple that is really valuable in a commercial way. The best we have from the growers standpoint is Scott's Winter. It bears when the trees are fifteen or sixteen years old, and the fruit is of moderate size, 2¾ inches on the average. The yield is from five to six barrels. This is

the only winter apple we have that there is any profit in. Golden Russet is the next best bearer, but it is shy with us. An acre of Golden Russet will give us about as much money in five years as an acre of Fameuse will in one. The Canada Red comes in the same category, and cannot be grown on a paying basis. We have a promising winter apple in the Milwaukee, which we are now testing. It is a seedling of Duchess, and has a great many characteristics of that variety, both in the tree and in the fruit. The tree requires very little care, does not run to suckers, develops fruit buds early, and seems to be a business tree. The fruit is more oblate than Duchess, and it keeps very well into February. I have twenty five Milwaukee top-grafted on Gideon, Longfield, and other hardy stock. The apple is from 3¼ to 4 inches in diameter, and if it will only hang on the tree, I think it it will prove a valuable variety. At Ottawa it gives better on sandy soil than on heavy clay loam. It has borne with me since 1899.

CHARLES YOUNG, St. Joseph Island: I have had an idea for many years that we could grow apples in the North, and I therefore determined to attend this meeting in search of information. The trouble we have is in the selection of varieties. Unfortunately we were sent varieties to test which could not possibly succeed. If I had been asked previous to last winter to give a list of varieties that would succeed, it would have been a good deal different from the list I would give now. To give you an idea of the interest taken in fruit growing in the north, I may say that in September I received and answered 33 letters making enquiries in reference to fruit growing. I have made most money out of Duchess, Pewaukee, Scott's Winter and Gideon. They are classed as undesirable here, but we find them very desirable. The Pewaukee is apt to drop from the tree, but this may be overcome by heavy manuring and good cultivation. Scott's Winter is small, but has good keeping qualities. Gideon is a very good apple with us and does not decay at the core to the same extent as further south. I do not know of any other varieties that I can recommend except Wealthy. A good keeping winter apple we have not yet found. We cannot grow King, Baldwin or Spy. A great many Spys have been planted, but I am not aware of one that succeeded even when top-grafted on Baldwin and Talman stock.

Mr. MACOUN: Mr. Caston recommends top-grafting on Talman stock for his district, but what Mr. Young states seems to point to the fact that the same stock is not suitable for all districts. We have 90 tender varieties that could not be grown in the ordinary way which we have top-grafted on Russian stock. None of them survived last winter, showing that hardy stock does not make the top hardy enough to stand any extra cold. The general supposition is that a hardy stock makes the top hardy. We have found that the only advantage of top-grafting on hardy trunks is that you avoid sun scald on the trunks, and bring the trees into bearing earlier.

Mr. CASTON: I do not think it was ever claimed that it would make the top appreciably hardier. My claim has always been that where decay and failure, either in the root or the stock occurs, it may be overcome by top grafting.

Mr. HILBORN: I am inclined to think from my experience that the stock influences the root. We had plums grafted on peach stock and growing in the same block with peach trees, and nearly all the plums came through last winter, whereas every peach was killed,—the roots of the peaches were killed, not the tops.

Mr. MORRIS: My opinion is that the root has no influence on the top, but the top does influence the root. Talman Sweet is usually recommended for top-grafting, having come into use years ago when it was about the only

hardy variety we had. At the present time we have a large number of varieties that are better than Talman for top-grafting, and make stronger, handsomer, and far better trees in every way, such as Gideon, Haas, McMahon White, Pewaukee, Wallbridge, etc. I would avoid the Russians because they stop growing early in the season. They have but one growth in the season, and that is the reason they are successful in cold countries. American and English varieties make a second growth of wood, which in cold countries like Manitoba is killed in winter, because it has not ripened. Ripening early, as Russian varieties do, you will notice that in a rainy season following a season of drouth, they will throw up suckers from the root.

Q. How is Yellow Transparent?

A. I would not recommend it for topping.

Mr. CASTON: Yellow Transparent is one of the best stocks there is to work Spys on in our section.

CHERRIES.

G. C. CASTON, Craighurst: I have been experimenting with the Russian varieties. These are excellent canners. If I were asked for a list, I would place them something like this: First, Orel 24. This is hardy with us, although last winter the fruit buds were killed on all plum and cherry trees. The tree does not make a rapid growth, but the trunk is smooth, and not inclined to blemish. The fruit is fair size, about the same as Ostheim, and nearly black when ripe. Then Ostheim; then Russian 207. This is a red cherry. Then Lithaur and Bessarabian. Bessarabian is a red cherry and a very good one, but more subect to black-knot. Next in quality is Dyehouse, and English Morello. The latter has not behaved as well in the last few years as it did at first. It bears early, and I thought at one time it would take the lead. The Montmorency I have not fruited yet. The cherry most generally grown in our section in years gone by was Early Richmond.

CHARLES YOUNG, St. Joseph Island: We succeed remarkably well with cherries, that is sour cherries. I like Richmond, Montmorency, and English Morello. Up to last winter I could not say that one was more tender than another. Ostheim I do not think much of, and have never succeeded in getting a full crop. The only thing to recommend it is that it is the nearest approach we have to a sweet cherry when it is dead ripe.

Q. Do you get a crop of Montmorency?

Mr. YOUNG: Yes; a full crop.

Q. Did you have cherries this year?

A. Yes, but not a full crop.

Q. Have you the Orel?

A. Yes, quite a lot of them, and they are doing fairly well.

Mr. MACOUN: Last summer I visited the Lower St. Lawrence, sixty miles below Quebec, and was surprised to find that they could grow cherries there to perfection, and they have a very severe winter. I think that owing to the moisture in the air caused by the presence of large bodies of water, the buds are better protected in winter. It is the drying out of the buds by the cold dry winds of winter that does he killing. Damp cold has quite a different effect and does not dry them out.

Mr. JONES: My experience bears this out. I am satisfied that much of the loss last winter in apples, cherries and plums was due to drouth rather than to cold in the sense in which we usually regard it. Last winter our trees were frozen solid on November 15, and we had no thaws during

the winter and the trees remained frozen till the middle of March. During that time a certain amount of evaporation was going on from the twigs, and no moisture was supplied by the root system, and consequently the buds died.

Q. Would you say that winter thaws are good for trees?

A. I think so. I think it was the lack of a January thaw that was the chief cause of our serious loss.

Mr. MACOUN: If trees are protected from the winds during cold weather they will not dry out nearly so rapidly. I had fifteen varieties of apples sent me from Eastern Manitoba this fall which were as fine as any that could be grown at Ottawa. The grower had his orchard protected by windbreaks. I think that spruce hedges will partially solve the problem of apple growing in Manitoba.

Mr. YOUNG: We never have a January thaw in St. Joseph's Island. All small fruits are perfectly hardy with us except the blackberry, but of course some varieties are hardier than others. I can make more money out of strawberries than anything else. I sold from $500 to $600 worth last year, none of them at less than ten cents per box. I even shipped them to Toronto towards the latter end of the season.

Q. What is your strawberry season?

Mr. YOUNG: It is about two weeks later than at Oakville. It begins about the last week in June. Raspberries do not do quite as well. The Cuthbert grows too late into the season and the frost is hard on it on that account. The Louden is an all round better market berry.

Q. What is your principal market?

A. The local market. We cannot begin to supply the demand. We do not ship further than the Soo. Our market is of course very limited, but eastern growers send their fruit to Winnipeg and sell it for less money than they could get with us.

GRAPES.

M. PETTIT, Winona: I have fruited about 150 varieties, new and old. The new varieties have been very disappointing, and the only one I can recommend for general market purposes is Campbell's Early. It is early, productive and of fine quality and appearance. For vineyard purposes, I would recommend planting the following: Worden, Concord, Delaware, Lindley and Agawam. The latter has shown a weakness this year, being very subject to rot, more so than almost any other variety. I think this is on account of the leaf being rather smooth, which enables the spores to take hold more readily than on downy-leafed varieties. I would also recommend Vergennes, and Catawba, where it ripens. In White grapes, Moore's Diamond and Niagara. Moore's Diamond is early and of good quality. Rogers No. 43, 44, and 28 are also good grapes to plant. I would strongly recommend the Kniffen system of pruning grapes. It is more simple and cheaper than the old fan system and can be done by inexperienced help.

As regards fertilizers, I have used wood ashes, stable manure and commercial fertilizer. I do not think there is anything to be gained from lime fertilizers on heavy soils where you have sufficient moisture. They may give a little more growth of wood, but little if any more fruit.

Q. Will it not pay to fertilize if the wood growth is poor?

Mr. PETTIT: Yes, with varieties that do not make enough wood growth, you can force it in this way to advantage. With the stronger growing varieties, if you have moisture enough you will have plenty of wood growth with ordinary cultivation.

Peaches.

W. W. Hilborn, Leamington: As you are aware, in the Leamington district we lost most of our peach trees last winter, owing to the cold weather killing the roots? The tops came through in good condition and came into bloom. In some cases the fruit set, but it shrivelled up later on, and the trees died.

Q. Is the bark sound around the trunk above the ground on the trees that are living?

A. I examined a good many orchards containing trees of different ages, and found that trees were killed sometimes solely at the root, and sometimes there was a ring around the tree just above the ground or just below the limbs. Most of the trees that escaped were young trees one year planted.

Q. Would not a cover crop prevent winter-killing?

Mr. Hilborn: I see by the Horticulturist that a grower in New York State saved his trees by growing chickweed as a cover crop where hundreds of trees not so protected were killed. It is, however, difficult to grow a cover crop in an orchard of mature trees, as immediately around the trunk, the crop will not grow.

Q. Would it not be beneficial to grow the trees in sod and mulch heavily around the tree?

Mr. Hilborn: It might be worth trying. Rape was formerly a good cover crop, but will not grow now as there appears to be a blight on the leaves.

Q. What do you think of budding peaches on plum stock? Would it not give a hardier fruit?

Mr. Morris: My experience in that connection was very satisfactory. We budded several thousand trees, and while they made a good growth the first year, they soon died out.

Prof. Hutt: I watched the conditions in Mr. Hilborn's district, and think that what is needed is a good heavy crop. On their light land it is difficult to secure this, but I think that the hairy vetch would be found satisfactory. We have tried eighteen different cover crops at the College, and we find that hairy vetch makes a quick growth in the fall and is very thick, and comes through the winter without any trouble.

Mr. Hilborn: Would it not be difficult to get rid of it close to the trees in the spring?

Prof. Hutt: The shade of the trees would kill it out.

Mr. Morris: I find that if sown early it will grow around the trees nicely, and will form a mat which will hold the moisture to the roots during winter.

Q. Is not the seed very expensive?

Prof. Hutt: You can get it at $4.50 a bushel. The seed will not mature in this country.

Mr. Hilborn: The following list of recommended varieties covers the whole season: Alexander, St. John, Early Crawford, Fitzgerald, Garfield, New Prolific, Engol Mammoth, Elberta, Crosby, Bronson, Golden Drop, Kalamazoo, Banner, Smock.

Mr. Woolverton: For home use I would suggest the Sneed, coming in about July 26.

Mr. Hilborn: It as not been very satisfactory with us, as it is small and rather poor in quality.

Pears.

A. W. Peart, Burlington: If I were planting a pear orchard next spring and you asked me what variety I would plant, I would say Duchess on Quince root. If you asked for a list for the Burlington district I would recommend the following: Clapp's Favorite, Bartlett, Duchess, Keiffer, and Winter Nelis.

As regards money in pears, there has been very little this year, for the reason that the crop was only a moderate one, and pears were badly stung by curculio, and some varieties were badly spotted. Many of the growers who have been in the habit of exporting tender pears such as Clapp and Bartlett, did not ship any at all. We have had a sad experience in connection with our export shipments, and until facilities are such as will command the confidence of the shippers, I do not think we shall ship many. We can ship Duchess without cold storage to Glasgow, and it is the best bearing pear we grow.

Q. Do you plant Duchess deep?

Mr. Peart: About six inches below the point of grafting. If planted higher a heavy rain followed by hail is apt to throw them sideways. I think six inches is quite deep enough.

Q. Have you tried Duchess Standards?

Mr. Peart: Yes, but they are not nearly as good as Duchess Dwarfs.

Mr. Pettit: I can find no sale for Keiffer. I think there are too many Keiffer trees in the country now. There is not more than a quarter of them in full bearing, and when they do come in, what are you to do with the fruit?

Mr. Peart: In my experience they have brought in as much money as any other variety we grow. It is a variety that will rise in public estimation as it becomes better known. When fully ripe, the flavor is superior to Bartlett.

Mr. Pettit: Where did you sell your Keiffers and make money out of them?

A. Glasgow is our market. You can afford to sell them at a low price because of their productiveness. The average price last year was four shillings per box, reckoning five boxes to the barrel. After deducting nine shillings for grading, packing and packages, you have a net profit of about eleven shillings per barrel. Duchess sold at eleven and twelve shillings per box: that is 50 to 60 shillings per barrel.

Q. Do you still advocate the general planting of Keiffer?

Mr. Peart: Merely in the Burlington district. I would plant some, but there is more money in Duchess.

A Member: In our section Keiffers are being grafted over.

Q. If there is more money in Duchess, why should you plant Keiffer?

Mr. Peart: The Keiffer will, I believe, establish a name for itself as a preserving pear..

Q. What were they worth at the Burlington canning factory this year?

Mr. Peart: I did not sell any to the canning factory.

A Member: I sold some and got only half a cent a pound.

Mr. Peart: The price on the local market is no test, provided you can place the fruit on the foreign market in good condition.

Q. Is not the Keiffer an excellent pear to graft on?

Mr. Pettit: Flemish Beauty trunks are larger than Giffard while Keiffers are very much smaller.

Mr. Peart: I believe there are different families of Keiffers. I find that one line of stock may give larger pears than another line.

Mr. Pettit: We thought the same thing, and marked the trees that had small pears. Next season they were the trees that bore the larger pears, and the other trees the smaller ones.

Q. Do you find the Winter Nelis blights?

Mr. Peart: Not with me

Q. Can you give a remedy for blight?

Mr. Peart: I can give a preventive. Over-cultivation and care tends to induce blight. Do not take too good care of the trees, and do not over-cultivate and fertilize them.

Q. Have you tried Giffard?

A. The Wilder is better with me, although not quite as fine in quality.

Charles Young, St. Joseph's Island: Pears have never been much of a success with us, and I'm afraid they never will be. Anjou has wintered well with me, whereas Flemish Beauty has been killed.

Plums.

Harold Maitland: My European varieties of plums last winter were almost entirely killed out. This year we had no fruit and no blossoms on any of the trees except on Glass, Gucii, and Shipper's Pride. The latter is the only one that grows to maturity, and Glass is evidently the hardiest of the three. I have two varieties of Dunlop seedlings from the island of Montreal — Raynes, and Mount Royal — that came through last winter without injury and grew nicely during the summer; they promise to be hardier than anything I have in European varieties. The Japanese have proved tender with us both in wood and bud. I have Red June, Burbank and Maru. They came through without any injury and bore two specimens of fruit, which goes to show that they were hardier than the European varieties as they were growing under the same conditions.

Plums of the true American type have not been doing as well with me on heavy clay loam as they have been doing on the sandy soil at Ottawa. I think that this is a case where the soil should be changed. I have plums of the same group and of the Chickasaw group that are doing remarkably well. Among them the Whittaker gives promise of being quite valuable as a garden variety. I cannot say whether it will be valuable as a commercial variety, as whenever I have placed Whittaker and other red plums on the local market in competition with the European plums grown in the Niagara district, they have not sold well.

Q. What is their value for preserving or canning?

Mr. Jones: Whittaker is a nice canning plum; it is thin skinned, does not break, and gives a nice clear syrup, but there is a slight bitterness from the stone.

A. W. Peart, Burlington: The best commercial plums in the Burlington district are the European varieties such as Bradshaw, Niagara, Quackenboss, Yellow Egg and the Reine Claude. Speaking generally, I may say that too many plums are planted in this province and that there is no money in them.

W. W. Hilborn, Leamington: In Essex we are not growing many plums. I have handled a few hundred trees, but last year they were affected the same way as the peach trees, through winter killing. We did not have a January thaw and the frost went so deep that it destroyed the roots, while the tops were not injured. We lost three quarters of our plum and peach trees.

A. M. Smith, St. Catharines: I obtained two new varieties of Burbank from California, and both have done remarkably well with me during the last two years.

Mr. Hilborn: The Bradshaw, Lombard and Monarch have succeeded best with us. The yellow varieties are very good on light soil.

Q. How did the Monarch stand last winter?

A. About the same as the others; the young trees came through, but the older ones were killed.

Charles Young, St. Joseph Island. In plums, the American varieties break down. European varieties may give a good crop one year, and the next the tree may be dead. The Japanese have been the most successful of any varieties I have tried.

Mr. Macoun: We find that American varieties of plums recover so rapidly after breaking down, that it pays to grow them, and growers around Ottawa are planting more every year. To avoid this difficulty, you might plant Cherry or Aitken; they are of the wild type and never break down. We have tested one hundred varieties of new American plums and some of them and very fine indeed, including Admiral Schley, Bonberger and Smith. These are superior to the Hawkeye. We are growing a seedling called Welcome, which has more good points than any American plum I have tested. Japanese varieties have not been successful at Ottawa, the buds having been killed every winter, with the exception of Red June. We are growing seedlings of this variety which had a very fair crop this year where other varieties were killed. We have called these Togo and Oyama.

REPORT OF INSPECTION.

By Prof. H. L. Hutt, Ontario Agricultural College, Guelph.

The past year has been one of the most trying that Ontario fruit growers have experienced in a long time. The extreme severity of last winter caused the loss of at least one-third of the fruit trees of the Province. This loss was not confined to any particular section, but was more or less general throughout the Province. On the whole, the Niagara district suffered less than most others, the injury being confined mostly to the loss of fruit-buds. In the Essex district hundreds of acres of peach orchards were destroyed, while plums, cherries, and even apples were more or less seriously injured. In northern and central Ontario more than half of the plum and pear trees were winter killed, and many varieties of apples proved too tender. In eastern Ontario apples are the principal tree fruits grown, and the most of these are of the hardier varieties, but in many cases even the so called hardy varieties were winter killed, particularly where the trees had borne heavily the previous season. This fact was quite evident in all sections: that those trees which were over-loaded last year and consequently were somewhat weakened by the heavy drain upon the vitality, suffered most severely from the severity of the winter. An excellent example of this was afforded in the orchard of Harold Jones, Maitland, where a dozen or more of his Fameuse trees most heavily loaded last year are now dead; and one tree which bore very heavily only on one side is dead upon that side, and so far quite healthy on the other.

Note—For illustrations of this Report see pages 61-64.

On account of the great loss of trees throughout the country there will necessarily be an extra lot of replanting to do next spring. For this reason I have made it a point to get from each of the experimenters a carefully prepared list of the varieties of the different kinds of fruit he would recommend for planting in his section. These lists, coming as they do from men of wide experience in fruit growing, are of particular value to intending planters, and I would strongly urge that they be published as soon as possible so that they be in the hands of the planters before the time for ordering the stock.

The Southwestern Station, Leamington.

This station is in the centre of what has been regarded as one of the best peach sections in Ontario. Many growers in this district had gone so extensively into peach culture that they had from fifty to one hundred acres of peach trees in bearing. The first great set back came with the severe winter of 1898 and 1899, when nearly 90 per cent. of the trees were winter killed. Mr. Hilborn at that time had one hundred acres of peach trees just nicely in bearing, but lost all but four or five acres. Since then he had been replanting till he had about eighty acres again in trees. Last winter, however, killed out nearly every peach trees on his place, and I heard it stated that there was probably not ten acres of healthy peach orchard left in all of that district.

Mr. Hilborn is not discouraged, however, but would like to plant again a small orchard of the leading varieties for experimental work.

My own impression is that the best thing we could do for the fruit growers of that section would be to set out an orchard of ten or twelve acres of the leading varieties of peaches and conduct experiments more along the line of cover crops and methods of winter protection. This at the present time would be of greater value to that section than extensive variety tests.

In this connection Mr. Hilborn said that if the Board decided on planting more trees, he would like to be allowed to procure them himself, on an order from the Board. He says that he can procure them cheaper than they are usually supplied to the Board, and in fresher and better condition when they come to him direct.

The following is a list of the varieties of peaches, plums, and cherries which Mr. Hilborn recommends for planting in his section:

Peaches: Alexander, Yellow St. John, Brigden, Early Crawford, Fitzgerald, New Prolific, Engol Mammoth, Elberta, Crosby, Kalamazoo, Golden Drop, Banner, and Smock.

Plums: Burbank, Satsuma, Bradshaw, Lombard, Monarch, Imperial, Gage, and Reine Claude.

Cherries: Napoleon Bigarreau, Schmidt's Bigarreau, Mercer, Yellow Spanish, Windsor, Montmorency and Early Richmond.

Since Mr. Hilborn has had to turn his attention to something else than peaches, he has gone largely into the growing of early vegetables, such as cabbage, cucumbers, tomatoes, and melons. As he is in one of the most southern sections of Ontario and on particularly warm sandy soil, he has all the natural advantages for producing very early crops, which usually bring a high price in the market. He says his tomatoes this year paid better than peaches ever did.

The Wentworth Station, Winona.

The fruit to which special attention is being given at this station is grapes, of which Mr. Pettit has about twenty-five acres, including 146 varieties.

The vines set their usual heavy crops this year, but on account of the cold, backward season, the fruit was very late in ripening, hardly any of it being fit for display at the time of the Toronto Exhibition. Many of the late varieties, in fact, did not ripen their crop at all. The brown and black rot of the grape were much worse this year than ever before in Ontario. In many vineyards, particularly of the Roger varieties, the crop was more than half spoiled. It is important that grape growers should know that both of these forms of rot can be kept in check by thorough spraying with the Bordeaux mixture. If the disease gets a good foothold in this country, as it has in many of the grape growing sections of the United States, it will be impossible after a time to get a crop of grapes without thorough spraying.

The results of Mr. Pettit's variety tests are already valuable, for they show plainly that very few of many new varieties advertised are of value in this country. From among the large number tested, the following are recommended as a few of the best: *Black*—Concord, Worden, Wilder, and Campbell's Early; *Red*—Delaware, Lindley, Agawam and Catawba; *White*—Niagara and Moore's Diamond.

In addition to his vineyard, Mr. Pettit has about forty acres in orchards, mostly of pears and plums. He has 28 varieties of peaches, 25 of plums, 16 of cherries, 12 of pears, and 6 of apples.

So far he has been reporting almost wholly upon his specialty, grapes, but we think it would be well to have from him, as well as from the other experimenters, a report on the other fruits which they are growing largely. This would widen considerably the usefulness of the stations, and we could well afford to allow the experimenters extra for the extra work required of them.

Of the other fruits tested Mr. Pettit recommends the following varieties as the most profitable for his section:

Peaches: Alexander, Greensboro, Yellow St. John, Early Crawford, Elberta, Smithson, and Smock.

These are given in their order of ripening, and he would advise planting only a few of the first two mentioned.

Pears: Giffard, Bartlett, Howell, Duchess and Anjou.

Plums: Bradshaw, Lombard, Grand Duke, Burbank, Yellow Egg, Reine Claude, and Monarch.

Cherries: Napoleon Bigarreau, Windsor, Reine Hortense, Black Heart, Early Richmond, and Bessarabian.

The Burlington Station, Freeman.

Mr. Peart has a large general collection of fruits made up of 69 varieties of apples, 45 of pears, 50 of plums, 10 of peaches, 8 of cherries, 28 of grapes, 27 of currants, 6 of gooseberries, 22 of blackberries, 3 of raspberries, and one of quinces. Many of these he has had under test for a long time, and is thus in a position to give valuable information regarding the best varieties to

plant in his section. Following is a list of the varieties he recommends of the various classes of fruits:

Apples: Summer: Astrachan, Duchess. Fall: Ribston and Blenheim. Winter: Baldwin, Spy, Greening and King.

Pears: Wilder, Bartlett, Clapp's Favorite, Anjou, Clairgeau (dwarf), Kieffer, Winter Nelis, Easter Beurre.

European Plums: Bradshaw, Niagara, Quackenboss, Lombard, Imperial Gage, Reine Claude; *Japan Plums*: Willard, Abundance, Burbank, Satsuma and Wickson.*

Peaches: Champion, Crosby, Elberta, Early and Late Crawford, Smock and Tyhurst.

Cherries: Early Richmond, Montmorency, English Morello, May Duke, and Windsor.

Grapes: Worden, Concord, Delaware, Lindley, Niagara and Moore's Diamond.

Currants: Red: Wilder, Cherry, Pomona, New Victoria, North Star; Black: Saunders, Naples, Collin's Prolific; White: White Grape and Imperial.

Raspberries: Marlboro, Miller, Cuthbert, and Loudon.

Gooseberries: Industry and Downing.

Fruit trees on the whole wintered fairly well in this section last year, and the crop this year was about up to the average. In Mr. Peart's apple orchard the crop of Ribstons was exceptionally fine. His plum orchard has suffered severely with shot hole fungus during the past two or three seasons and most of the trees will not survive another year. The young experimental pear orchard set out six or seven years ago is coming nicely into bearing, a number of new varieties were fruiting this year for the first time.

The Black Rot of the grape made its appearance in this section this year as well as in the Niagara district. The crop in Mr. Peart's vineyard was more or less severely injured.

The Lake Huron Station, Walkerton.

At this station we have also an excellent general collection of fruits for experimental work, made up of 75 varieties of apples, 35 of pears, 45 of plums, 25 of cherries, 20 of raspberries, 15 of blackberries, 15 of currants, 6 of gooseberries, and a half dozen or more strawberries. So far Mr. Sherrington has been reporting principally upon apples, plums, and raspberries. At the time of my visit he was in the midst of his small fruit harvest. Currants and gooseberries were an excellent crop. The raspberries had suffered from the severity of the winter, and also from the drouth in that section last summer. Plums and cherries had suffered from winter killing more than any other fruits, and there was no crop in the trees left. Strange to say, the Japan plums had, with few exceptions, proved more hardy than the European or Domestica varieties. This has been the case also at most of the other stations.

Mr. Sherrington is very thorough in his management of his orchards and fruit plantations, and success usually crowns his efforts. He has been par-

*The Wickson is not productive enough to be profitable.—The Secretary.

ticularly successful with his apple orchard, and has not missed a crop during the last six or eight years. His crop of Northern Spys this year was well worth seeing.

Mr. Sherrington intends putting out a new plantation of raspberries in the spring, and will use very largely the plants of his own growing, but would like our Board to furnish him with a few plants of some of the newer varieties which he has not yet tested.

The Georgian Bay Station, Clarksburg.

At this station there is a good general collection of apples, pears, peaches, etc., but special attention has been given to plums, of which about 170 varieties have been under test.

The trees here, as in most other sections of the Province, had suffered more or less from winter killing, particularly in the old orchard where the trees were so heavily loaded last year. The crop this year was comparatively light. Quite a number of the Japan plums have for several years been fruiting heavily at this station, and last winter they stood well while a number of the European varieties succumbed to the severity of the weather.

The following is a list of the European varieties which Mr. Mitchell recommends as having done the best with him: Washington, Imperial Gage, Bradshaw, Quackenboss, Arch Duke, Diamond, Monarch, Yellow Egg, Coe's Golden Drop, and Reine Claude.

He has found the Japan plums not nearly so salable as those of the European class, but considers the following the best: Red June, Burbank, and Satsuma.

Mr. Mitchell has under test ten varieties of peaches, all the trees of which bore heavily last year, but last winter gave them a severe test, and where the trees were not killed outright the fruit buds were destroyed.

The Simcoe Station, Craighurst.

In this section of Ontario, hardiness is necessarily a first consideration in the selection of varieties of fruits for planting. Mr. Caston has an excellent general collection of apples, pears, plums, cherries, and the small fruits, which he has had under careful test for a number of years. He is thus in a position to give valuable information on any of the fruits suitable for that district. He has for a number of years past strongly advocated the plan of top working the best varieties of apples, such as Spy and King, upon hardier stock, such as the Talman Sweet. The advantage gained by this practice was quite evident this year, after the severe test to which the trees were put last winter. The varieties of apples which he recommends for that section are: Duchess, Alexander, Peerless, Snow, Blenheim, Greening, Fallawater, Ontario, Spy, Gano, and Stark. The Baldwin, Greening, King, Spy, and Ontario, he says, should always be top grafted on hardy stock in that district.

Out of the 25 varieties of cherries tested for a number of years he recommends Ostheim, Orel No. 24, Russian No. 207, Bessarabian, Montmorency and Dyehouse.

Mr. Caston has been very successful in the cultivation of raspberries and blackberries, which not only bear well but bring profitable prices in the local markets.

The Cuthbert has been his best red raspberry, while Agawam and Eldorado have been his most profitable varieties of the blackberry.

The Bay of Quinte Station, Trenton.

This station is in the centre of one of the best apple growing sections of Ontario, and nowhere else in the country do I know of a more successful apple grower than our experimenter, Mr. W. H. Dempsey. His annual crop averages about 2,000 barrels. This year it would be somewhat over that amount.

Not long ago I was asked by the editor of one of our leading commercial papers why it was that growers such as Mr. Dempsey and a few others obtained such prices as $2 and over per barrel, while the great majority were glad to get $1 per barrel. My answer was that it was all a question of business management. Mr. Dempsey not only looks carefully after the packing of his fruit, but he keeps in close touch with the leading apple markets, and watches closely the cabled reports of each day's sales. At the time of my visit to his place last October he had already shipped to the Old Country two or three car lots of Snows and Alexanders and was just putting up 100 barrels of Kings for shipment when the reports came of the great slump in the English markets. He decided at once to leave the Kings in his fruit house till the market revived, and went on with the picking and storing in the same way of the later varieties still on the trees in the orchard.

His fruit house has a capacity of 2,500 barrels, and when not filled with fruit it affords storage for the empty barrels which are made up on the place.

Mr. Dempsey has in his orchards 300 varieties of apples, 40 of pears, 30 of plums, 6 of cherries, 3 of peaches, and 2 of quinces.

The following are the lists of varieties he recommends for planting in his section:

Apples: 13 of the leading commercial varieties in order of their ripening, Duchess, Gravenstein, Trenton, Wealthy, Fameuse, McIntosh, Pomme Grise, King, Greening, Ontario, Seek, Spy, Swayzie, Jonathan and Tolman.

A few of the most promising new varieties: Star, Fanny, Garden Gem, Parline's Beauty, Coe's River, Winter Banana, Boiken, Windsor Chief and Rome Beauty.

Pears: Giffard, Tyson, Clapp's Favorite, Bartlett, Boussock, Beurre Hardy, White Doyenne, Dempsey, Bosc, Clairgeau, Goodale, Lawrence and Josephine de Malines.

Plums: Saunders, Burbank, Abundance, Imperial Gage, Lombard, Shipper's Pride, Chabot, Niagara, Damson, Reine Claude.

Cherries: Early Richmond and Montmorency.

Peaches: Fitzgerald stood last winter uninjured.

Quince: Orange.

The St. Lawrence Station.

Fruit trees in the St. Lawrence Valley suffered severely last winter. Mr. Jones has made careful note of the relative hardiness of the different varieties, and will be able to give valuable information upon this point in his report.

He has a good general collection of the hardiest varieties of fruits, made up of 74 varieties of apples, 40 of pears, 51 of plums, and 11 of cherries.

Only a few of the hardiest varieties of pears and plums survived the winter, and none of them, with the exception of the Americana plums, have fruited satisfactorily.

Many varieties of apples supposed to be quite hardy were not sufficiently so to stand the severity of last winter. A young orchard of 150 Ontario apple trees, three years planted, was entirely destroyed. Blenheim, Ben Davis, and Stark trees also were killed or more or less severely injured. Even large trees of Fameuse and Scarlet Pippin, which have been bearing regularly for the past 20 years, were killed outright. In nearly all cases, however, these were trees which had weakened their vitality by over-bearing the previous year. Trees of the same variety along side, which bore no crop last year, were quite healthy and bore heavily this year. In this connection a valuable lesson may be learned as to the importance of keeping trees at all times in good health if possible, and not allowing them to lose vigor through over-bearing, attacks of insects, fungi, or other causes.

For a commercial orchard Mr. Jones has found the Fameuse, McIntosh and Scarlet Pippin the most profitable varieties for his section, but for a general home collection, covering the season from early to late he recommends the following:

Apples: Yellow Transparent, Astrachan, Duchess, Alexander, Fameuse, McIntosh, Scarlet Pippin, Wealthy, Milwaukee, Scott's Winter, and Golden Russett.

Pears and plums cannot be relied upon for profit in that section, although a few may be grown for home use. The following are the varieties which Mr. Jones recommends as a result of his testing so far:

Pears: Flemish Beauty, Clapp's Favorite, and Ritson.

Plums: Whittaker, Wolf, Stoddard, Red June, Maru, Ogon, and Glass.

Cherries: Early Richmond, Montmorency, Orel, and English Morello.

The Maplehurst Station, Grimsby.

Mr. Woolverton has 100 acres closely planted with fruit. His collection of varieties is one of the largest and most representative to be found in Ontario. It is made up of 50 varieties of apples, 60 of pears, 60 of plums, 100 of peaches, 100 of cherries, 5 of quinces, 12 of apricots, 50 of grapes, besides his collections of currants, gooseberries, and strawberries.

From this collection, as well as from those of all of the other experiment stations, Mr. Woolverton is taking notes for his descriptive work on the "Fruits of Ontario." In our annual report he has been reporting chiefly on his collection of cherries. The following are the varieties he recommends for planting in his section:

Sweet Cherries: Governor Wood, Napoleon, Knight, Tartarian, Elkhorn, and on clay soil, Windsor.

Sour Cherries: Montmorency and English Morello.

He has about 200 Windsor cherry trees six or seven years old which have made good growth, but have borne very little fruit. While trees of the same variety on heavy soil at Mr. Orr's a few miles farther west have fruited heavily.

The past winter killed the fruit buds on most of the sweet varieties in Mr. Woolverton's collection, and the crop as a consequence this year was very

light. The sour varieties came through the winter uninjured and bore heavily this year.

The Algoma Station, Richard's Landing.

Last winter was a severe test for the hardiness of trees in Northern Ontario, and some valuable lessons have been learned as the result of this year's observations. Mr. Young is an enthusiastic fruit grower and a careful observer, and his reports are of great value to all interested in fruits in northern Ontario.

I cannot give a better idea of some of Mr. Young's work than by quoting a few of his answers to questions I put to him last summer. In answer to the question as to what kinds of fruits he is growing, he says: "I am trying to grow a little of almost everything in the way of fruit except peaches, without making a specialty of any one thing. The work so far has been purely experimental. If the question had been what had made the most money, I should have answered without any hesitation, strawberries, and after that Fall apples. I have in round numbers 35 of apples, 9 of pears, 12 of cherries, 11 of plums, 8 of strawberries, 10 of gooseberries, 7 of currants, 5 of raspberries, 8 of black raspberries, 7 of blackberries, and 8 of grapes.

In answer to the question "What varieties of apples would you recommend for planting in your section," he says: "I will make the list very short: *Fall*—Astrachan, Duchess, Charlamoff, Yellow Transparent and Gideon. *Early Winter*—Longfield and Wealthy. Scott's Winter is the best late winter, but it by no means fills the bill. A late-keeping apple of good size and quality and as hardy as some of our fall apples we have not gotten so far. I thought we had it in the Ontario, but last winter was too much for it, although I think if the trees had been a few years older it would have come out all right, as it is now, I am disappointed in this apple."

In answer to the question as to how trees wintered in his section, he says: "They apparently came through the winter fairly well, but the spring or early summer killed 20 per cent. of them. To explain: the summer and fall of 1903 were extremely wet here, which induced a long sappy growth which was not fully matured when winter set in. We had no fall to speak of between summer and winter, then followed the excessive cold of winter, 48 degrees below zero on the main land, and 46 below at this station, and for days in succession 30 below zero. This, no doubt, weakened the vitality of the trees, but with the exception of the tips of last season's growth I could see nothing the matter when they got their annual pruning between the 12th and 20th of April. The first week in May was excessively hot in the day, with hard frost at night, which brought on sun scald, which is the principal cause of failure in fruit growing in the north. The trees leafed out all right with the exception of a few cherries, but just as soon as the sap, in the top of the tree was exhausted and the circulation stopped, the tree began to die. There was no root killing, although the snow at no time was very deep. Most of the trees were killed to the snow line and are making new growth a foot above ground. They may in a few years make better trees than they were originally. Six feet of a clean trunk is not the thing for trees in this section three feet is quite high enough. If I had taken my usual precaution and protected the trunks of the tree from the sun I have no doubt most of them would have come out all right, but this I omitted in the fall.

"As to what varieties have suffered most: This has puzzled me some, for varieties that had been considered hardy for instance, Tolman, Golden Russett, and Ben Davis, are nearly all killed. I have lost no trees planted six years ago except two Wageners. Among pears, Keiffers, which bore some fruit last year, were killed to within a foot of the ground. Anjou, which I had not considered extra hardy, was uninjured and came out better than even Flemish Beauty. A few sweet cherries I had are dead, others are gradually dying."

First Report From New Ontario.

List of fruit sent to S. B Bisbee, New Liskeard, June, 1904

	Number Rece'd	Number Living	Remarks
GRAPES			
Campbells' Early	3	3	Growth sixteen inches
Concord	3	3	" twelve inches
Niagara	3	3	" twenty-four inches
Lindley	3	3	" ten inches
Delaware	3	3	" fourteen inches
PLUMS			
Burbank	3	3	Tops dead
Red June	3	3	Two living, one dead top
Abundance	3	3	All thrifty
CHERRIES			
English Morella	3	2	Not thrifty
Montgomery	1	1	Strong and healthy
APPLES			
Salome	3	3	One with dead top
Duchess	3	Dead	
Wealthy	3	3	One with top dead
Charlmof	3	3	Fairly healthy
BERRIES			
Cuthbert	6	4	Growth 12 inches. Bore Aug. 20th and until frozen, Sept. 15th
Marlboro	6	4	Growth 10 inches, a few berries on one bush
Shaffer	5	3	Growth about 9 or 10 inches, bore a few berries
Gainor	6	4	Growth eight inches, in bloom Sept.
CURRANTS			
White Grape	6	5	Growth in all, good, white grapes bore two bunches of fruit but did not mature.
Black Naples	6	4	
Fays	6	6	

DEAR SIR,—The above report is, I consider, very good, as the trees were to all appearances dead, having been one month in transit. Plums and cherry trees had been in bloom in the case and had become all mildewed and all were in such poor condition that I had very little hopes of any success

I was very much pleased with the Cuthbert Raspberry, as the first ripe fruit was picked in nine weeks after planting and several of the bushes bore abundantly until frost came in the middle of September.

GENERAL NOTES BY EXPERIMENTERS.

JOHN MITCHELL (*Georgian Bay Station*).

The winter of 1903-4 will be long remembered by the fruit growers of Ontario. For depth of snow and prolonged period of cold it was the severest in the memory of the oldest inhabitant of the district. Thousands of trees were killed by the frost, a great many were girdled by mice, others were so much weakened that, altogether with the unusual cold of the summer, they did not bear at all, or brought forward a most imperfect crop of fruit. Only about one-third of the apples were fit for export, the rest were generally too small and were left in the orchard for the pigs.

Plums.

Of plums we had only about twenty baskets, scattered among twelve hundred trees. I have not a single new variety to give a detailed description of. Fortunately there is no great blanks of the most desirable varieties in the experimental plot, although we lost many in the older part of the orchard. If it has been a poor year for fruit it has been a good one to test the hardiness of varieties, which I will try and describe in notes on varieties.

CULTIVATION. I have noticed some articles written this season rather reflecting against cultivation. After many years of experience with thorough cultivation I would consider it indispensable to success in the plum orchard. In years like the last two or three, when there is a disposition to over-abundant moisture cultivation in the apple orchard would not be so necessary, but in a dry season it would be the salvation of the crop. It has been suggested that it will promote scab. I do not see it that way unless under certain conditions. Trees growing in sod usually make little wood, and therefore need little pruning; while trees in cultivation grow rapidly, producing a thick growth of young wood and heavy foliage which shuts out free circulation of air and sunshine; and, if not properly pruned, this would develop scab more rapidly than in the more open and slow growing sod orchard.

COVER CROPS. For our part of the country we find nothing more reliable than the common red clover. The Crimson failed last season while the red lived through, producing a heavy stand in good time for plowing in. It should be sown here about the last of July.

INSECTS. We have had no trouble with insects this season and therefore nothing to note.

ARNDT TREE PROTECTOR. We put on a number of tree bands about the first of May. They were examined occasionally and about the middle of July, the larva of a few codling moths were found, not any more than would be found in any old sacking tied around the tree. They might keep down caterpillars if they were not numerous; but if they were, they would soon bridge over them. I cannot recommend them until further tested.

FERTILITY. This is certainly the key to success. In gathering show fruit I have noticed there was always some special reason for better fruit in some places than in others and the reason generally was the degree of fertility of the soil. No amount of spraying, pruning or cultivation will produce the best fruit without fertility.

HAROLD JONES (*St. Lawrence Station*).

Apples.

The low temperatures of the past winter caused great damage in the orchards of this district. Many varieties of apples that have been succeeding fairly well for a number of years past were killed, while others, not injured in the wood, had their fruit buds injured. Such varieties as Ben Davis, Stark, Ontario, and Mann, are nearly all killed or severely injured, while Canada Red, Blue Pearman, Ribston and even Tolman Sweet were injured to some extent in the fruit bud. Fameuse and Scarlet Pippin trees that were heavily loaded last year were injured, and McIntosh, the hardiest of the Fameuse group, showed weakness in the foliage where loaded heavily the previous year.

Plums.

Plums were ruined, especially those of European type. The Americana plums proved hardy, and all but a few varieties of the Japanese plums were killed. The detailed report on plums show the European and Japanese varieties that survived.

Pears.

Pears were also killed to a large exthent, only a few varieties like Flemish Beauty, Clapp's Favorite, and Ritson, coming through with any appearance of health. Some of the Russians are very hardy, viz.: Bessemianka, Winter Pear and Victoria; but the fruit is of no value, as it all seems to have the same serious defect of decaying at the core, even before fully ripe.

The injury to the fruit trees generally seemed to be caused by a drying out of the buds and twigs, as the roots in every case of loss were in a healthy condition and sent up sprouts where allowed to do so.

From the middle of November until the middle of March we had steady cold weather with much wind and bright skies, which gave us a cold, dry atmosphere, and which caused constant evaporation of moisture from the twigs; and there was no rise of temperature during January or February to cause the trunks to thaw out sufficiently to carry water from the roots to the twig.

To sum up, the trees did not die from rupturing of the cell tissue due to low temperatures, but died of drought or drying up of the cell tissue of the twigs and small branches from lack of moisture that should have been supplied from the root system.

The apple crop on the whole was under the average, but the quality is good, as there were very few insects, and "spot" did not develop to do damage, even to Fameuse, which is very subject to this disease.

A. E. SHERRINGTON (*Lake Huron Station*).

Owing to the severe winter of 1903-4 and a very late spring, notes on varieties will of necessity be short; so many trees and plants being killed or so weakened that they bore little or no fruit.

INSECTS of all kinds were very scarce this season, and very little harm was done to fruit of any kind by them.

FUNGI were not so prevalent as in some seasons, and spraying was more thoroughly done. Mildew destroyed all of the English gooseberries, as usual.

Tree Protectors. Some 60 feet of what is called the Arndt tree protector was sent to this station for trial, and were put on the trees according to directions. As to protecting the trees from "all manner of crawling and creeping insects" it is simply an absurd claim, anyone that knows anything about the habits of insects injurious to fruit trees, knows that most insects are hatched or brought to life up in the trees, above the so called protector. How then, can it protect the tree? In my opinion this protector is of little use. A good spraying machine is worth a car load of the so called "tree protectors."

Chas. Young (*Algoma Station*).

The winter of 1903-4 has been a very trying one on fruit trees at this station. The failures have been many, and the result rather discouraging; especially is this so in a section of country where fruit growing is as yet largely in the experimental stage.

The summer of 1903 was very hot, warm, moist weather continuing into winter; this no doubt induced a long sappy growth of wood and not fully matured. Then the winter of 1903-4 was extremely cold; the thermometer on one occasion going as low as 46 degrees below zero, and for days as low as 30 degrees below. Then about the end of March during the day the sun came out strong, followed by sharp frost at night, producing sun scald, one of the chief obstacles in the way of successful fruit growing in the north. I had neglected to protect the trunks of young trees the previous fall. Had I done so, many might have been saved. As it is the loss among young trees planted less than five years ago, is about 15 per cent. Among those that have borne one or more crops, and are killed or partly killed, are Tolman, Wagener, Ben Davis, and Ontario. I am disappointed in the last, as it had previously borne heavy crops of fine winter apples, and I had thought that in this apple we had found just what we were looking for all these years—a long keeping variety of good quality, attractive appearance and sufficiently hardy to stand the cold in the north. As it is, all trees of this variety are killed back, although not entirely killed, and all are making growth low down on the trunk. When we bear in mind that no such a trying season has occurred within the memory of the oldest inhabitant, say in fifty years, the Ontario is still worthy of further trial, and I will try them top grafted on Longfield, as this variety seems capable of standing anything in the way of sun scald. Owing to the early and continued snow the frost was never more than three inches in the ground. Root killing is therefore unknown in this locality. In my experience here of twenty-one years, I cannot recall an instance of a tree being killed by freezing of the roots.

It is now five years since experimental work was begun at this station. Three years after planting, some fruit was gathered from Yellow Transparent, Ben Davis and Wealthy. At four years, Princess Louise, Longfield, Scott's Winter and Duchess came in. Several others while making satisfactory growth have had no fruit. Last season the fall varieties had a fair crop, and winter varieties, with the exception of Wealthy, and Scott's Winter, none. In my old orchard there was a full crop of fall and about a half crop of winter fruit. In some cases five barrels each were picked from trees 15 years planted, which sold here on the local market, 25c per 11-quart basket, or $2 a barrel. Winter fruit was undersized and not quite half would grade XXX.

A. W. Peart (*Burlington Station*).

In a general way this has not been a profitable fruit year. With the exception of apples and pears, prices were good, but there was not very much fruit. The winter was so severe that the buds of peaches, plums, and many cherries were destroyed, and the crop of these fruits was short. All kinds of trees and vines, however, fared better, few being killed by the winter. The season was cold, backward, and wet until the last of August. Since then little rain has fallen, plantations generally look well, and the wood is going into winter well ripened. In the interests of fruit growers something should be done to secure a better distribution of fruits over our home markets. As it is at present the cities are more than filled with fruit at times, a glut results and prices say below the cost of production; whereas if there were a better distribution among the consuming points, prices would be sustained and a higher average reached.

Apples were only a half crop. The quality was good, although the spot and the codling moth were somewhat in evidence. The canker worm and the tent caterpillar were scarce. Prices were low, but improved as the season advanced.

Blackberries were a light crop, many varieties being frozen to the snow level.

Currants also were short in quantity. The worm was not plentiful. Cherries gave a very low yield, the Montmorency probably taking the lead.

Gooseberries were a light crop.

Grapes were about two weeks behind time in ripening, and many varieties rotted badly.

Pears were a fair crop. Prices, however, ruled very low. The ideal pear soil appears to be a rich clay loam, well drained. The Keiffer, however, seems to thrive better on sand.

Plums were conspicuous by their absence. Prices were high. The Japan trees appear to be very hardy. Where there were plums the curculio was out in force.

Peaches were not plentiful. There was little or no disease among them.

Raspberries were a fair crop at good prices. The slug was easily kept in check by spraying with hellebore.

A. E. Annis (*Wabigoon Station*).

Apples.

The only apples we have are about 15 seedlings. They are not old enough to fruit, but are apparently hardy; the terminal growth not on the most of them, being destroyed by frost. The stocks are protected from sun scald. One Whitney crab is alive, but freezes back badly.

Strawberries: Clyde have done well, but Saunders has a great many of green points, which make them unsuitable for a table berry.

Raspberries: Cuthbert is hardy and gave a good yield. Columbia, (purple), with extra protection has now for two seasons given excellent results. Black raspberries are altogether too tender, and the same may be said of gooseberries, most of the bush killing back to main stock. Black currants as usual have proved very hardy and gave a good yield.

Following are notes on fruits under test, with lists of varieties which have proved to be undesirable in the districts represented. The varieties named are in alphabetical order:

APPLES.

By W. H. Dempsey (*Bay of Quinte Station*).

The experimental apple orchard came through, practically without injury last winter, and some of the varieties bore fine crops.

Boiken: Yielded an abundant crop of fine, clean, handsome apples.

Cooper's Market: Bore a fine crop of good sized apples, for the variety, and well colored.

Canada Reinette: Heavily loaded with fair sized, dull looking apples, not very attractive.

Fanny: Heavily loaded with fine dark red apples; ripened in August and remained in very good condition through September; they were of very good quality.

Blunt: Fairy loaded with handsome apples of no special value.

Bismarck: Yields a good crop every year, but is of little value.

Beechers Red: A very productive crab apple of good quality; makes delicious jelly; ripens last of August.

Barcelona Pearmain: Bore a good crop of fine looking apples of the Russet type, but they wither soon after picking; they are a long keeper, but of no value.

Coo's River Beauty: Bore more freely this year than usual; the apples were very clean, handsome and red, of good quality, shewing signs of keeping longer than in other years; may be of some value.

Carlough: Had a very heavy crop of greenish yellow apples; does not look as if it woud be of any value here; it is a fair keeper.

Dora: Is a heavy cropper, similar to Ontario in fruiting (in fact it is of the same parentage), large yellow fruit; ripe about the last of September, but of no value.

Ella: Another seedling of Spy and Wagener, a handsome summer apple, of good quality, but entirely too tender for shipping; a good amateur apple.

Green Fameuse: Heavy crop, badly spotted; of no value.

Garden Gem: Very heavily loaded; size, medium, excellent quality for home use.

Haas: Heavily loaded; medium size; no value.

Hastings: Heavily loaded, very even in size, of Fameuse type, very subject to fungus, of good quality.

Highland Beauty: Bears heavily; small, handsome apples, good for dessert; of no value for market.

Haskell's Sweet: Has been a long time coming into bearing; very poor sweet apple.

Isabella: A large whitish yellow apples, ripe in September; no value; fruits sparingly.

Isham: Heavily loaded, large sweet apple, similar to Bailey sweet, but not so valuable.

Baxter: Fruits sparingly; very large red apples of very poor quality; upright grower, subject to scab; of no commercial value in this district.

Lady Sweet: A medium grower; loads heavily each alternate year; fruit large, dull red; good keeper; does not take the place of the Talman.

Late Strawberry: Good grower; very shy bearer; fruit handsome, striped red, of good quality, ripe 1st October, would not recommend planting it.

Lawver: Fair grower, good foliage; crops heavily every alternate year; of medium size; a dark red apple, very showy, medium in quality; very subject to apple scab; would not recommend it for planting.

Maggies' Favorite: Excellent grower, similar to King, fruits very sparingly; size, large, roundish, dark red on yellow background, showy, very coarse grain, medium quality; October; of no value for planting here.

Magog Red Streak: Large yellow apple with faint streaks of red; of poor quality; undesirable.

Undesirable Varieties.

Archer.
Akin.
Barry.
Baxter.
Beauty of Kent.
Blunt.
Barcelona Pearmain.
Cabashea.
Canada Reinette.
Cellini.
Carlough.
Dora.
Ella.
Eicke.
Green Fameuse.
Golden White.
Grand Sultan.
Haas.
Hastings.
Hawley.
Highland Beauty.
Hurlburt.
Haskell's Sweet.
Hamilton.
Isabella.
Isham.
Lady.
Lady Henniker.
Lady Sweet.
Lawver.
Landsfinger Rennette.
Maggie's Favorite.
Magog Red Streak.
Mountain Tulip.
Mountain Beet.
Newtown.
Norcaster Spy.
Plumb's Cider.
Powell.
Pioneer.
Rawles Janet.
Royal Russet.
Rivers Winter Peach.
Rochelle.
Scott's Winter.
Sops of Vine.
Stump.
Switzer.
Scott's Russet.
Starr.
Utter's Red.
Wine Sap.
Winter St. Lawrence.
White Winter Pearmain.
Willow Twig.
White Pippin.
Winter Fameuse.
Walbridge.
Whinnery.

Harold Jones (*St. Lawrence Station*).

Alexander: Planted 1881. This has proved a vigorous, healthy tree, very hardy and fairly productive, coming into bearing about six years after planting in the orchard; fruit large, 3½ to 4 inches in diameter; high colored and attractive and takes well both in the Canadian city markets and for export. Especially adapted for cooking; season, September and October. A desirable apple in eastern Ontario counties.

Brockville Beauty: Planted 1880; tree a hardy moderately vigorous grower, coming into bearing about five years after planting in the orchard, bears heavy crops in alternate years. Fruit conical, 2 to 2½ inches in diameter; skin white, almost covered with bright red; flesh white, crisp, tender, breaking, brisk acid; a desirable apple for cooking as well as dessert; season, last of August to middle of September. Fruit inclined to run small when trees overload.

Blenheim Pippin: Three trees planted 1896. Tree tender, severely injured in 1893 and dead in the spring of 1894.

Baxter: Planted 1880. Tree a hardy, vigorous, upright grower; moderately productive, coming into bearing about eight years after planting. Fruit large, 3½ to 4 inches in diameter; skin greenish white, almost entirely covered with bright red and numerous dots; flesh coarse, juicy, brisk acid; a desirable cooker and a desirable market variety; season, 1st October to 1st January; some trees show sunscald but are generally free from blemish.

Blue Pearmain: A hardy, vigorous tree, but lacking in productiveness; trees planted in 1880 have never given a profitable crop as yet. A desirable variety to plant for home use on account of its high quality as a mid-winter variety, but not profitable commercially.

Bellflower: Planted 1880; a moderately vigorous, spreading tree: moderately productive; quality, good to best; season, from January to April; not an attractive apple in the package, but commands good prices when its value is known. This apple is known as Bishop's Pippin in Nova Scotia and Massachusetts, where it is much sought after on account of its quality as a dessert apple.

Chenango: Three trees planted 1896; a slow grower of spreading habit, comes into bearing four or five years after planting; a nice dessert apple for September, but has not shown vigor or productiveness enough to make it desirable.

Canada Red: This apple has been grown in the district for many years. The first trees grown on this farm were top grafted by my grandfather about 1830; a vigorous spreading tree that attains great age but lacks productiveness; keeps well until April; quality only fair, not acid enough to make a good cooker and not a favorite for table use.

Canada Baldwin: Three trees planted in 1896; a vigorous healthy tree coming into bearing slowly, but gives promise of being a desirable variety.

Gideon: A vigorous, healthy, hardy tree; fruit not desirable, owing to the serious defect of decaying at the core soon after ripening. This tree is generally liked as a stock for top grafting on, as it is very hardy and of vigorous growth, so that it can support a heavy top.

Hamilton: Three trees planted in 1896; a hardy, vigorous, upright grower, but fruit of no value for this district.

Hibernal: Three trees planted 1896; fruit of no value here, but the tree proves excellent stock for top working, making a vigorous growth, and no signs of injury by sun scald in the most exposed situations.

Longfield: A moderately vigorous tree, very hardy; comes into bearing in four to five years after planting; fruit of good quality; season, September and early October; inclined to overbear and of very little value here. Tree makes a good hardy stock for top grafting moderate growing varieties such as Wagener, Ontario, Wealthy, etc., but would not support a heavy top like Baldwin or Canada Red.

Late Strawberry: Tree a small scrubby grower, almost a thorn: fruit of no value: both tree and fruit undesirable.

Mann: Tree a rapid, slender grower, but not very hardy, being subject to sun scald and blight; can be classed among the undesirable varieties for this district.

Milwaukee: A seedling of Duchess; tree resembles the parent in growth and hardiness and comes into bearing at an early age; fruit large, more oblate than Duchess, but resembling this apple; season, November—March; a good cooking apple to the end of the season. This tree gives promise of being valuable for northern districts on account of its late keeping and good cooking qualities.

McMahon White: A very hardy, vigorous, healthy tree, with very tough wood not easily broken at the union of the limb to the trunk of the tree; fruit not valuable for this section, but the tree is one of the best I have have ever used for top grafting; a valuable tree for northern sections for top working desirable varieties that are subject to sun scald on their own stumps.

Ontario: The tree is subject to sun scald, and is not hardy in this section; 160 trees planted in 1899 were all winter killed last season; a few tops worked on McMahon White and Pewaukee stock were partly injured but not killed; not desirable.

Pewaukee: A hardy, vigorous tree coming into bearing at an early age, and bearing good crops; fruit drops at or before maturity, which is a very serious defect; fruit a fair keeper, coming out in good condition in February; possibly of value for northern sections on account of its hardiness, but should be planted in a limited way on account of the promptness necessary in harvesting the crop.

Peter: Three trees planted in 1896; no difference can be detected between this apple and the Wealthy.

Salome: Six trees planted 1896; tree a hardy, vigorous grower with round close head; fruit undersized and inferior; not successful in this district.

Sutton Beauty: Three trees planted 1896: these trees have shown weakness from year to year, and are all dead except one tree which struggles for existence; not successful and not hardy.

Undesirable Varieties for the St. Lawrence District.

Ben Davis.
Blenheim Pippin.
Dartmouth Crab.
Excelsior Crab.
Gideon.
Hamilton.
Hibernal.
Longfield.
Late Strawberry.
Ontario.
Orion Crab.
Palouse.
Roman Stem.
Salome.
Sutton Beauty.
Stark.
Shackleford.
Waxen Crab.
Winesap.

This list will be much enlarged from year to year.

A. E. Sherrington (*Lake Huron Station*).

The apple crop this year was the best that has ever been in this district; the crop was not only heavy, but was free from spot or worms, and all varieties were loaded, both early and late. The trees in my young orchard are seven years old; those in the old orchard twenty-five.

Alexander: Badly affected with twig blight last year so bore no fruit; will be grafted over.

A. G. Russet: Bore the finest crop that has been produced here, four to eight barrels per tree.

American Pippin: Tree six years old, had a few fine shapely apples the first fruiting.

Astrachan: Bore a heavy crop of clean fruit, which met with ready sale.

Barry: Trees top grafted to York Imperial.

Beauty of Kent: Bore a good crop; apples on the small side.

Ben Davis: Crop heavy, clean and of good size and color, eight barrels to the tree.

Bismarck: A very large, fine showy apple, one barrel per tree.

Colvert: Bore a heavy crop of under-sized fruit.

Cranberry Pippin: Was somewhat affected by the winter's frost, but appears to be doing well; a fine apple.

Duchess: A heavy crop this season, quality fine, four barrels per tree.

Fall Jenneting: A fall apple of fair quality, but a poor shipper and should not be planted.

Fameuse: Crop a little light; quality good; four barrels per tree.

Gano: As planted here is nothing but a Ben Davis; half a barrel per tree, six years old.

Grimes Golden: Crop heavy; a fine apple for home use; eight barrels per tree.

Greening: Crop heavy, clean and of good quality; four barrels per tree.

Hurlbut: Bore a few unshapely apples for the first; quality appears to be very good.

King: The crop of Kings was light and fruit rather small in size.

Mann: Crop good; apples large and clean; a long keeper; four barrels per tree.

McIntosh Red: Bore for the first this year a few apples of good size and appearance.

Mountain Tulip: A nice dessert apple, but too small to be profitable.

Northern Spy: Crop very heavy; clean and free from spot or worms; eight barrels per tree.

Ontario: Is top worked on Crab stock, and is doing well; crop good; apples large and clean; two barrels per tree.

Pewaukee: Is also top worked on Crab stock, and is producing large crops; fruit drops badly.

Peter: Produced a heavy crop of very fine apples resembling the Wealthy so much that the difference cannot be distinguished; one barrel per tree.

Ribston: Bore a good crop of fine apples; two barrels per tree.

Seek-no-further: Gave the largest yield; apples large and clean; eight barrels per tree.

St. Lawrence: Gave a large yield of fine clean fruit; six barrels per tree.

Salome: Tree healthy, vigorous and hardy; fruit medium to large, color striped and splashed with red: yield one barrel per tree eight years old.

Sweet Bough: A fine sweet dessert apple; tree hardy; fruit large; quality best for dessert.

Sour Bough: An apple of poor quality; not worthy of cultivation.

Tetofsky: Too small to be valuable in this district.

Wealthy: A good fall apple if well cared for and thinned when apples are about the size of plums; tree hardy and healthy; yield one bushel.

Yellow Transparent: Tree a vigorous grower; season, August; yield, one bushel.

Varieties Undesirable in the Lake Huron District.

Alexander.
Barry.
Cayuga.
Colvert.
Early Harvest.
Early Joe.
Fall Jenneting.
Fall Pippin.
Gideon.
Haas.
Hawley.
Keswick Codling.
Lowell.
Maiden's Blush.
Pomme Grise.
Pound Sweet.
Rambo.
Swazie.
Sour Bough.
Tetofsky.
Walbridge.
Winesap.
Wolf-River.

In my opinion it would be better for the grower and the country if we had only about a dozen good varieties in each section for export purposes.

By G. C. Caston (*Simcoe Fruit Station*).

The year 1904 will be long remembered by fruit growers. It has been a year to test the hardiness of all kinds of fruits. The winter was the most severe in the memory of the present generation, the temperature reaching the lowest point ever known here, viz., 34 below zero, the first week in January, and the coldest average for the winter months on record. The cold was continuous nearly all through the winter. For days together the temperature stood at 20 degrees below zero. The surprising thing is that the damage was not greater. The reason is probably that two favorable conditions existed. The new growths of wood were well ripened, and there was a great depth of snow. There was no damage to the roots as they were well protected. Whatever damage was done was above the surface of the snow. Reports of serious damage to the tender varieties of apples come from all over the country. Baldwins, Kings and Spys have suffered most. However, very few apple trees were killed in my own orchard, though some were injured. The Ontario trees were considerably injured; but where top worked on hardy stock it came through all right. Some trees of the Starr, Peck's Pleasant and York Imperial were killed outright.

It was an off year in this locality for nearly every kind of fruit. Early apples were plentiful as they are all hardy sorts, but the effect of the severe winter could be noticed even on them in their apparent failure to carry their usual load of fruit to maturity, much of it dropped before fully matured or colored. Winter apples were a rather poor crop, straggling and under-sized. Here and there there was a bunch of fairly good ones, but in most orchards the yield was light, and in many a total failure. In 1903, there was a very uniform crop, quite up to or over the average. This, followed by such an unusually severe winter, no doubt weakened the trees to such an extent that they were unequal to the task of bearing a crop of good quality this year. I am of the opinion that the full effect of last winter's cold has not been fully realized yet, and that many injured trees which

struggled through the summer alive this year, will be dead next spring. A season like the past one emphasizes most forcibly, what I have been advocating for years, the importance of top working our best apples on hardy stocks. It is the safest and surest plan to follow in growing commercial apples in this locality.

This was also an off year in prices, so far as apples were concerned. Early and fall varieties were a drug, and the price so small that in this era of high wages and scarcity of help it did not pay to handle them, and a great part of them went to waste. Prices were a little better for winter varieties, but not nearly so good as in the previous year when we had a full crop. Two things are apparent regarding our apples, viz:—(1) That a full crop in Europe has a very marked effect on the market value of our apples, more so than can be said of any other product we export; and (2) that the whole business needs to be placed on a better basis.

Of the top-worked trees there was slight injury to a few Baldwin grafts of bearing age; also a few grafts of the previous season with one year's growth of wood which had made a rank growth were killed. With these exceptions the top-worked trees came through well, and showed the healthiest appearance all through the summer.

No new varieties fruited this year, except a couple of Russians of such poor quality as not to be worth describing. They were, as is the case with nearly all of them, early varieties. The only Russian that I have fruited yet that has any pretence to keeping qualities is Bogandoff, and we have no use for it here where we can grow so many far better ones. It might be useful in the northern sections where they cannot grow the better class of winter apples, as it is, I believe, very hardy.

There is a Russian fall apple that I think may be an acquisition, if we admit that there is room for any more fall apples than we already have. I think this one would probably take the place of the Colvert. It is of the same season, a little coarser in texture, but a first-rate cooker; it is also larger and handsomer than the Colvert, and is moreover clean skinned and attractive. This is an early and heavy bearer, and very vigorous, healthy and hardy. I have it under three names, and it would be hard to say which is right—Romna, Hibernal and Romanskoe. I think this one would also be a useful fall apple farther north, where Colvert would not succeed. I would class it as the best Russian apple for its season that I have fruited so far.

There is one bad trait of the Russian apples. They do not cling well; but, like the Wealthy and Pewaukee, they are easily blown off before full maturity. This fruit is characteristic of most of them. The one mentioned above, however, is an exception, for it clings well until fully matured.

This year has been remarkably free from insect pests. The leaf-eating insects were conspicuous by their absence. There was also very little codling moth, probably the hard winter destroyed them. All the trees in the experimental ground get clean cultivation, and are fertilized by manure and ashes, and by plowing in clover occasionally.

There was little or no damage done by mice in this locality.

Alexander: One of the most profitable fall apples in this district. It bears well, is a splendid cooker and sells well.

Wolf River: Is also a good variety in this locality. It is later and keeps longer than Alexander; is very large, clean and attractive, and is a first-rate cooker.

Peerless: I still have a good opinion of this apple. It is one of the handsomest of the fall apples and unrivalled as a cooker; but the tree is rather a slow grower, and I propose to try it top grafted on other stock.

Blenheim: Is one of the very best late fall apples grown here. It is quite hardy and a good grower. The fruit is clean skinned and handsome, but it seems inclined to bear heavily in alternate years. This is, in fact, its only fault.

These four would make a very commendable list of fall apples for this locality. If I were to add another one, I think it would be the Russian variety, Romanskoe, described elsewhere. I have little use for Wealthy, for as the tree gets older the fruit becomes worthless. They overload, that is, they set more fruit than they can mature. Most of the Wealthy grown about here are wasted, they fall off before they are mature, and before they can be harvested.

A Commercial List for Simcoe County.

A list of winter apples which I would commend for this locality would be as follows:

Spy: Always first and best. The very best commercial apple.

King: Where top grafted on Tolman Sweet, it is bearing well.

Baldwin: Popular at home and abroad.

R. I. Greening: Always in demand for home market; needs to be well cultivated.

These four should always be top-grafted on some healthy, hardy stock, such as Tolman Sweet.

Of the varieties hardy enough to be planted in the usual way and grown without top grafting:

Gano: I prefer this to Ben Davis.

Stark: Not an early bearer, but a fairly good market apple.

Fallawater: Large, clean-skinned, handsome; growing in popularity every year.

Pewaukee: Hardy, healthy, a good bearer. Not recommended for export, but fills a place in the home market. Its chief fault is prematurely dropping from the tree.

Ontario: This variety should probably be in the list for top grafting, as the tree is not vigorous. It seems to be favorably spoken of by shippers as an export apple, but it will always be popular in the home market.

Summer and Autumn.

Chas. Young (*Algoma Station*).

Charlamoff: A perfect apple, but in season only two weeks.

Yellow Transparent: About the same season; not so showy, bruises easily.

Duchess: In every way a perfect apple in its season.

Astrachan: Has to be handled carefully; not so productive as some others.

Alexander: Large and showy; good; irregular bearer.

Winter.

Longfield: Requires thinning to have fair sized fruit, inclined to overbear, tree very hardy, good stock on which to top graft less hardy varieties.

Wealthy: No better winter apple for St. Joseph's Island; inclined to carry its fruit at the end of long, slim branches. For a perfect top, branches should be cut back, and fruit spurs encouraged to form closer to the trunk.

Scott's Winter: While not an extremist in clean cultivation, or heavy manuring, in a bearing orchard, this variety to do its best requires both; otherwise the fruit will average small; the top requires to be kept open in the centre to produce well colored fruit.

Walbridge: Hardy; regular bearer; of poor quality.

Golden Russet: Shy bearer, not a profitable apple; a good keeper.

Gideon: A very hardy, showy apple when grown in the north; inclined to rot at the core; succeeds better here than further south; very desirable.

Pewaukee: Desirable; needs good, rich ground in order to strengthen the stem; fruit not so much inclined to drop here as in some other sections; a good all round apple.

So far Wealthy has been our most profitable winter apple in the north.

Undesirable Varieties.

Undesirable varieties as far as I have tested them here are Blenheim, Stark, Rolph, Spy, King, Sweet Bough, Ben Davis, Baldwin, Mann; these should not be planted, nor do I think they would be satisfactory as top grafts. There are many others under test on which I am not yet prepared to report upon.

Snows, Scarlet Pippins and McIntosh as top grafts are satisfactory, but have not yet fruited.

Conclusions.

The following are a few conclusions arrived at from twenty-one years' experience in the north:

(1) That trees, as usually received from the nursery are headed too high.

(2) That top grafting upon a hardy stock is by far the most successful method to propagate those varieties which are not quite hardy.

(3) That in selecting a site for planting, low flat ground should be avoided, if possible, even if the soil is naturally dry or underdrained. I would prefer a hill top, if not too much exposed, to the valley at the bottom.

(4) That a free circulation of air is necessary and shelter from the northwest is desirable.

(5) That clean cultivation is absolutely necessary for the first few years.

(6) That some protection should be given to the trunk of the tree for some years such as a piece of bass bark, or a thin veneer. I have found a thick, heavy coat of whitewash, applied in the late fall, to answer the purpose, especially where the branches start from the trunk, that part being particularly liable to sun scald.

(7) And finally, that there is a local demand for all the fruit we can raise here for many years to come, and at very much better prices than can be obtained in the east.

A. W. Peart (*Burlington Station*).

Commercial List for Burlington District.

Duchess,
Ribston Pippin,
Blenheim Pippin,
King,
Greening,
Baldwin,
Northern Spy.

One should have a tree or two for domestic and dessert purposes of the Astrachan, Sweet Bough, Gravenstein, Wagener, Seek-no-Further and Golden Russet.

New Varieties.

These were top-grafted on Roxbury Russet trees in 1901, and the following have borne fruit:

Hauseley's Winesap: Fruit, mottled red, small to medium, conic-round; stem, medium length; very few spots; basin, shallow; subacid vinous.

Highfile: Fruit, medium, roundish flat, yellow, mantled with dark red. Some spots; sub-acid, juicy.

Minnesota Pippin: Fruit, medium to large, round turbinate, yellow striped and mantled with deep red. A few spots; acid, sprightly.

Ozark: Fruit, very dark red, fine grained, smooth skin; medium, round, some spots, slightly acid.

Pennsylvania Red Streak: Fruit, medium to large, roundish flat, yellow, splashed and striped with red, slightly spotted, sub-acid.

Revel: Fruit, large, striped with red, roundish flat, no spots; sub-acid, of pleasant flavor; promising.

Red Limberton: Fruit, small, round, mottled greenish red; some spots; sub-acid. A poor specimen.

W. C. Limberton: Fruit, very small, deformed spotted, roundish flat; sub-acid; poor.

The above varieties appear to vary from early to midwinter in season. It is too soon yet to determine their quality and value.

Undesirable Varieties for Wentworth County.

Speaking from a commercial standpoint, I would not plant the following varieties:

Holland Pippin: Spots too badly.

Snow: The same trouble.

Pewaukee: Poor appearance and quality, and drops from the tree too easily.

Keswick Codlin: Color and season against it.

Rambo: Too small.

Cranberry Pippin: Not productive enough; rough and spotted.

J. G. Mitchell (*Georgian Bay Station*).

Baldwin: There has been a great loss in young trees one to three years old; hundreds of them have been killed outright in this district. The older trees endured the cold better, still there were a great many branches and large limbs badly injured on many of the trees. The Baldwin is one of the most tender of the apple trees we have in the Georgian Bay district.

King: The King was the next after the Baldwin to suffer from the cold. Many branches and limbs were killed, and the trees were so much weakened that the fruit was under size and poor.

BLACKBERRIES.

A. W. Peart (*Burlington Station*).

Blackberries were a light crop. Owing to the cold, wet weather in May, blooming was delayed ten days to two weeks beyond the average season. Similar conditions also retarded ripening. The exceptionally severe winter drew a sharp line between woody and tender kinds, only eight of the twenty-two varieties passing through safely; the others were frozen to the snow level. Blackberries appear to thrive best on a high, well-drained soil, but yet require a damp, though not wet bottom. Wood ashes or potash in one of its forms are probably the best fertilizers. Stable manure, or an excess of nitrogen, tends to promote a rank, soft growth, not suitable for passing safely through the winter.

Hardy Varieties for Burlington District.

The hardy varieties are:

Agawam,
Snyder,
Western Triumph,
Taylor,
Stone's Hardy,
Eldorado,
Wachusetts,
Ancient.

Briton: The tender varieties are mentioned below as they occur in the list, but their roots were not frozen. All were grown on a well-drained gravely loam. The roots grew up strong young canes, and the whole plantation is going into winter in good condition.

Commercial List for Wentworth County.

Agawam,
Snyder,
Western Triumph,
Taylor,
Ancient Briton.

Eldorado, Early King, Wilson's Early and Humboldt require further trial. Undesirable varieties are found elsewhere in this report.

Agawam: Planted 1901; cane dark red, vigorous, upright grower, hardy and productive; berry roundish-oblong, medium size 7-8x3-4 inch, firm of good quality; season, medium; yield per hill, 1 quart.

Ancient Briton: Planted 1901; cane dull red, moderately vigorous, upright, hardy, productive; berry oblong-conical medium 7-8x3-4 inch, of good flavor; season, medium; yield 1 1-4 quarts per hill.

Dorchester: Planted 1901; cane, brownish red, vigorous, upright spreading, tender, a poor cropper; berry, large to very large, 1 1-8x3-4 inch, roundish-oblong, firm, when ripe of fine quality; season, medium; no fruit this year; frozen.

Early Cluster: Planted 1901; cane dull red, vigorous upright-spreading, tender, not productive; berry roundish oblong, medium size, 7-8x3-4 inch; sweet, of good quality; season, early to medium; no fruit; frozen.

Early Harvest: Planted 1901; cane greenish color, moderately vigorous, stiff and upright, tender, retains foliage late in season, very productive, requires close pruning; berry medium, 1x5-8 inch, oblong, thimble shaped, of fair quality; season early; no fruit; frozen.

Early King: Planted 1901; cane dull red, medium vigor, tender, upright spreading, productive; berry small to medium, ¾x5-8, rich, roundish oblong, of excellent quality; season, early to medium; no fruit; frozen.

Eldorado: Planted 1901; cane brownish-red, upright-spreading, medium vigor, hardy, moderately productive; berry medium to large, 1x3-4 inch, oblong-conical, sprightly, of excellent quality; season, medium; yield, ¾ quart per hill.

Erie: Planted 1901; cane greenish-red, moderate vigor, spreading, retains leaves late, tender, but productive; berry of good quality, medium 7-8x 3-4 inch, roundish-conical; season medium; no fruit this year; frozen.

Gainor: Planted 1901; cane, reddish green, very strong, spreading grower, retains foliage late, tender, but productive; berry very large, 1 1-4 x7-8 inch; roundish-oblong, of fine quality; season, medium; no fruit; frozen.

Humboldt: Planted 1902; cane reddish-green, upright, tender, medium vigor; no fruit, frozen. No chance as yet to report on fruit.

Kittatinny: Planted 1901; cane, dark red, with greenish patches, very vigorous, upright-spreading, late foliage, tender, productive; requires long pruning, very resistive of drouth; berry large to very large, 1 1-8x3-4 inch; oblong-ovate, sub-acid, rich and juicy; season late; no fruit; frozen.

Lovell's Best: Planted 1901; cane, dark red, strong, very stiff upright grower, tender, but productive; berry, oblong-round, medium, 7-8x3-4 inch, of fair quality; season late; no fruit; frozen.

Maxwell: Planted 1901; cane reddish-green, retains leaves late; very weak, light grower, very spreading, tender, poor cropper; berry oblong-round, large to very large, 1 1-8x3-4 inch, of excellent quality; season medium; no fruit; frozen.

Minnewaski: Planted 1901; cane greenish-red, retains leaves late, strong, upright-spreading, tender and unproductive; berry, medium, 7-8x3-4 inch, roundish-oblong, of good quality; season, early to medium; no fruit; frozen.

Ohmer: Planted 1901; cane reddish-green, vigorous, spreading, retains leaves late, as most of tender varieties appear to do, tender and productive; berry, very large, 1 1-4x7-8 inch, coreless, soft, oblong-oval of good quality; season, medium; no fruit; frozen.

Snyder: Planted 1901; cane, dark red, vigorous, upright, hardy and very productive; berry, medium, 7-8x3-4 inch, oblong-oval, of fair quality; season early to medium; like many of the medium size varieties it requires severe pruning, otherwise the fruit will be small, and some of it will shrivel on the bushes. This berry also turns red when picked, if exposed to the sun; yield, 1 quart per hill.

Stone's Hardy: Planted 1901; cane brownish-red, strong, upright, hardy and productive; berry, oblong-oval, somewhat soft, small to medium, ¾x 5-8 inch, of good quality; season, medium; yield, ¾ quart per hill.

Taylor: Planted 1901; cane, reddish-green, medium vigor, upright, spreading, hardy and productive; berry, medium size, 7-8x3-4 inch, oblong-oval, of good quality; season, medium to late; yield 7-8 quart per hill. A good commercial variety.

Wachusetts: Planted 1901; cane dull red, medium vigor, upright, hardy, but not very productive; has but little commercial value; berry of fine quality, medium size, 7-8x3-4 inch, oblong-round; season, medium to late; yield 1-3 quart.

Western Triumph: Planted 1901; cane dull red, strong, upright, hardy, very productive; requires severe pruning; berry medium, 7-8x3-4 inch, oblong-round, of good quality; season medium; yield, 1 quart per hill.

Wilson's Early: Planted 1901; cane dark red, strong, upright, spreading, tender, tends to propagate by tips as well as suckers; berry large, 1x3-4 inch, oblong-round, rich, of good quality; season, medium; no fruit; frozen.

Wilson's Junior: Planted 1901; cane reddish green; moderately strong grower, spreading, waiting, tender, not productive; propagates by tips and suckers; berry, medium 7-8x3-4 inch, oblong-oval, sweet; season, medium; no fruit; frozen.

No ideal blackberry has been found here. If one be hardy it lacks in size or quality, and if large it is wanting probably in hardiness.

Undesirable Varieties for Wentworth County.

Dorchester: A poor cropper as well as tender.
Early Cluster: Tender and unproductive.
Early Harvest: Too tender.
Gainor: Too tender.
Lovett's Best: Too tender.
Maxwell: A low bush variety, too tender and unproductive.
Minnewaski: Tender and not productive.
Ohmer: Too soft and tender.
Wachusetts: Not productive enough.
Wilson's Junior: Tender and not productive.

G. C. Caston (*Georgian Bay*).

Agawam and Eldorado are the two varieties for this section. Of nearly 20 varieties tested, those two are the only ones recommended. But for the first time they were killed back this year. Other winters they never lost an inch of their bearing wood. Last winter they were frozen down several inches below the surface of the snow, so that there was only about one-fifth of a crop. Up to this year I have had splendid crops of both varieties above mentioned, and I do not hesitate to recommend them still, as they will stand our ordinary winters all right. I consider the blackberry one of the most profitable of the small fruits.

Charles Young (*Algoma Fruit Station*).

Blackberries with me have been a perfect failure. If I attempt to lay them down the canes break; if I let them stand the snow breaks them down. I will try a new plantation in the spring and see if I can do any better.

A. E. Sherrington (*Lake Huron Station*).

Blackberries were a total failure here; the plants were all broken down by the snow or frozen out. However, they made a splendid growth the present season.

CHERRIES.

L. Woolverton (*Maplehurst Station*).

My report on cherries for the year 1904 must be very brief owing to the almost complete failure of the crop. This failure was in part due to the unusually severe winter which killed the fruit buds on a large number of the sweet cherry trees, and in part to almost continuous rains during the month of July, which caused the Monilia rot to develop to such an extent as to destroy what few of this class of cherries had escaped the effects of the severe winter. The black aphis also appeared quite early, an enemy which is often very injurious to both tree and fruit; but this season, owing probably to the continuous rains, this insect did not increase as we anticipated, and did very little injury.

The Bigarreau class of cherries, such as Napoleon, Yellow Spanish, Rockport, etc., were almost a complete failure from rot; indeed all the magnificent cherries of this class need a perfectly dry atmosphere in which to ripen if a good yield of fine fruit is to be harvested. This explains why it is that in British Columbia and in California such magnificent crops of Napoleon Bigarreau are raised free from rot.

The *Duke* cherries gave a small yield, and these too were much affected by the rot. These are in a sense intermediate between the sweet and the sour, and are most excellent for all culinary purposes. One, the Reine Hortense, is so very large and of such excellent quality that it is suitable both for dessert and for cooking. Even this variety gave but a few scattered fruits.

The *Morellos* bore a prodigious crop, but the later pickings were so badly stung by the cherry fly that the fruit was worthless. These cherries are the latest to ripen in my whole list, and bear so heavily almost every year that we would recommend them for profit were it not for the fly, which during the last few seasons, has become a most destructive pest.

The *Pie Cherry* class or *Kentish*, came through the best of all and gave a splendid yield. They were neither affected by the cold of winter nor by the rains of summer, nor by the aphis, nor by the cherry fly. The *Early Richmond* and the *Montmorency* are the two favorites of this class, and are everywhere known among cherry growers. The former is the earliest, the latter a little later, and the best for main crop. The *Montmorency* loads so heavily that it is easily gathered and is so litle affected by the curculio stings that it needs little or no sorting for market. Some others of this class may prove very desirable for cold sections, even more so than those mentioned. For example the *Orel 28* is a very productive variety; it succeeds well in Simcoe county and Mr. Jones, our experimenter in the St. Lawrence district, believes from the description that it is the kind which has seen the most promising at his station. With us, this cherry ripened on the 18th of July. The fruit is not as large as the *Montmorency*.

Another promising variety of this class is the *Russian 207*, which is a little earlier than the Orel, and the tree is very productive.

The *Shatten Amarelle* ripened on the 18th of July; its fruit is very similar to the Montmorency, both in size and in appearance. The tree is very vigorous and very productive.

Ostheim bore small dark red cherries, quite scattered on the tree, and quite subject to curculio. It is of no use at all in the Niagara district.

Lutovka was badly subject to curculio this season, and the fruit was badly affected by curculio.

Grenner Glas was also unproductive this season; the fruit was of the same season as the Orel.

Strauss Weichsel gave fruit very similar to the Ostheim, but it was sweeter. The yield was small.

Of the *Heart cherries* one only of the whole list is worthy of mention this season, viz., the *Knight*. Like the Montmorency it seems to be proof against weather, fungus or insects, and yields a fine crop every year of the very highest class of dessert cherries. The fruit, although thick upon the tree, does not hang in clusters, and every cherry is perfect. It is almost black when ripe and of a fine size. The tree is quite productive; one old tree, 40 years planted, gave me a crop this season of 160 quarts of fruit.

Governor Wood also gave me a fair crop of white oxheart cherries, and is about the best of its color.

My experimental plot in cherries has now reached a good bearing age and should give valuable data for future reports.

G. C. Caston (*Simcoe Station*).

The fruit beds were entirely killed on all varieties of cherries, which shows that while they will survive an ordinary winter, yet it is very doubtful if they will stand a temperature of 30 degrees below zero uninjured. There may be some modifying circumstances which might affect the result of a very cold dip, such as if the cold dip were of very short duration, instead of a long continued spell of "below zero weather;" the condition of the trees, etc. But I would say that anything colder than 24 below zero, if continued for several days, will endanger the fruit buds on nearly every variety now under cultivation. We have had cherry trees come through a dip of 25 degrees and 26 degrees below all right. However the cold was of short duration. It would be a difficult matter to define the exact limit of cold that cherry buds will stand without injury.

Two varieties were winter killed this year, viz., Love Apple and Uranian Kirsch. All the others came through the winter with the loss of the fruit buds only, of the varieties tested the following are my preference:

Orel 24: Tree a slow grower but healthy and hardy. Fruit, fair size; dark in color, nearly black when ripe; flavor rich, spicy, agreeable; would rank as a fairly good dessert variety, and is taken in preference to any other for canning purposes.

Ostheim: One of the best of the Russian varieties.

Litham: A small black cherry. Its chief fault is its small size. An excellent canning variety.

Russian 207: A red cherry, a little later than Early Richmond; of good size and the tree is hardy and thrifty.

Bessarabian: A red cherry of good quality; tree only moderately productive, healthy and thrifty

Dyehouse: Somewhat resembles English Morello; a great bearer, but a short lived tree here.

English Morello: Is not entirely hardy here. It beats all other varieties for early bearing; it bears a great crop when in good health, but for the last two years has shown signs of early decay.

Wragg: Is English Morello under another name. There is no difference between the two varieties. Should the fruit buds come through all right next year I hope to have something more satisfactory to report.

W. H. Dempsey (*Bay of Quinte Station*).

The wood of the cherry was uninjured by frost, while the fruit bud on all varieties were killed except some of the more protected buds of the common red cherry, and the Russian Koslov cherry received from the Fruit Growers' Association some years ago.

Charles Young (*Algoma Fruit Station*).

Sour cherries have been a success, but sweet cherries are a failure, and if the trees are not dead, they might as well be so. I have some 14 varieties under test, many of them so near alike that I cannot see a difference. This climate seems to suit the cherry to perfection, and they can be grown profitably. Early Richmond, Montmorency, and English Morello I consider the best varieties to plant, and I would plant Richmond only because it comes in a few days ahead of the others. A few trees were killed back last winter. I have never expeenced any trouble with frozen blossoms, in looking for the effects of a frost at night. I have noticed a thin film of ice in the morning covering the blossom which drops off as the sun gets up, leaving what is under untouched. Perhaps this is on account of our near proximity to the water causing more moisture in the air. Cherries with me have been a success.

A. E. Sherrington (*Lake Huron Station*).

Here again we met with some loss, especially among the Black varieties. All the Elkhorn trees were killed; also the Tartarians. The Morellos came through all right, with the exception of having the fruit buds killed. The only variety to fruit was the English Morello and the Wragg, which are essentially the same cherry.

Harold Jones (*St. Lawrence Station*).

Undesirable Varieties for the St. Lawrence District.

Governor Wood (not hardy).
Black Knight (not hardy).
May Duke (not hardy).
Olivet (not hardy in bud).
Reine Hortense (not hardy in bud).

CURRANTS.

A. W. Peart (*Burlington Station*).

Currants were about two-thirds of an average crop. The backward spring delayed their blossom nearly two weeks over the average time, while ripening was from a week to ten days behind. All the varieties tested here appear to be hardy. Currants require a rich, damp, but not wet, soil. Probably no fruit will so quickly and generously respond to liberal manuring and cultivation. Stable manure is without doubt, the best for them, mulching and fertilizing the soil at the same time. They also require severe pruning and thinning out the old wood to keep the bush in a well balanced shape. The ends of the longer young shoots may also be cut off to maintain symmetry.

Commercial List.

The best commercial varieties here seem to be: Victoria, Wilder, Cherry, Prince Albert and North Star for red; Saunders, Naples, Lees Prolific and Collin's Prolific for black; Grape and Imperial for White.

The following varieties are in full bearing:

*Belle de St. Giles**: Planted 1896; bush, weak spreading, hardy and unproductive. Leaves, dark green; bunch, long, compact, berry, dark red, acid, large to very large, ½ to 5-8 inch; quality fair. Season, medium. A large showy variety but a poor cropper, yield per bush. 1904, 1½ lbs.

Brayley's Seedling: Planted 1896; bush of moderate vigor, upright, spreading hardy, not very productive; leaves, light green, bunch, medium length, loose and straggling; berry, dark red, medium size, 3-8 inch, very acid, sprightly flavor; season, medium; yield 3 lbs.

Champion: Planted 1896; bush upright, moderate vigor, hardy, productive; leaves dark green; berry, very large, 5-8 inch in diameter, black, sub-acid; season, late; yield 2½ lbs.

Cherry: Planted 1896; bush upright, spreading, vigorous, hardy and very productive; leaves, dark green; bunch short and compact; berry dark red. medium to large 3-8 to ½ inch, acid, season, medium, yield 5 lbs. sweet sub-acid, firm; season medium to late; yield, 5 lbs.

Collin's Prolific: Planted 1898; bush very vigorous, upright, variable cropper, leaves dark green; berry, black, large to very large ½ to 5-8 inch, sweet sub-acid, firm; season medium to late; yield, 5 lbs.

Crandall: Planted 1897; bush upright, spreading, very strong, vigorous, rampant grower; hardy and moderately producive; leaves very light green; bunch, short, compact, berry, variable in size 3-8 to 2-3 inch, bluish black, with thick skin, sweet sub-acid; ripens unevenly, fruit found in all stages from very small and green to very large and ripe, some of the later berries hanging until frost; season, medium to very late; yield 7 lbs; said to be good for canning.

Fay's Prolific: Planted 1898; bush moderately vigorous, very spreading, hardy and fairly productive; leaves, dark green; bunch long and loose; being large to very large; ½ to 5-8 inches in diameter, red, firm, sub-acid; season, medium; yield, 3 lbs.

Lee's Prolific: Planted 1896; bush, spreading, fairly vigorous, hardy and moderately productive; berry, black, large to very large, ½ to 5-8 inch, sub-acid; season, medium, yield, 3 lbs.

Naples: Planted 1896; bush, upright, spreading, hardy and very productive; leaves, dark green; berry, black, large, ½ inch, sub-acid; season, medium; yield, 3½ lbs.

New Victoria: Planted 1897; bush, spreading, very vigorous, hardy and produstive; leaves, dark green; bunch, long and loose; berry, red, small to medium, 3-8 inch; sub-acid, agreeable flavor; season, medium; yield, 6 lbs.

North Star: Planted 1896; bush, strong upright, hardy and moderately productive; leaves, green; bunch, medium long, compact; berry, red, medium to large, 3-8 to ½ inch, acid, sprightly; season, medium to late; a good late variety; yield, 3 lbs.

Pomona: Planted 1897; bush, medium vigor, upright, spreading, hardy and fairly productive; leaves, dark green; bunch long and compact; berry, red, medium to large, 3-8 to ½ inch, sub-acid of fine quality; season, medium, yield, 4 lbs.

*Note by Secretary.—We doubt if this is true to name. We will identify it by securing plants from various sources for comparison.

Prince Albert: Planted 1897; bush, strong, spreading, hardy and productive; leaves, dark green, large and deeply serrated; bunch, short to medium; berry, small to medium, 3-8 inch, light-red, very acid; season, late; yield, 5 lbs.

Raby Castle: Planted 1876; bush, upright, very vigorous, hardy, and productive; leaves, light green; bunch, short and compact; berry, light-red, small to medium, 3-8 inch, firm acid; season, medium; yield, 5 lbs.

Red Cross: Planted 1896; bush, spreading, vigorous, hardy and productive; leaves, light green; bunch, short and compact; berry, red, medium to large, 3-8 to ½ inch, firm, sprightly sub-acid; season, medium: yield, 4 lbs.

Red Dutch: Planted 1897; bush, spreading, moderately vigorous, hardy and very productive; leaves, light-green; bunch, medium length, loose berry, red, small, 1-3 to 3-8 inch, acid and fine flavor; season, early to medium; yield, 5 lbs.

*Red Victoria**: Planted 1896; bush, upright, spreading, very vigorous, hardy and very productive; leaves, light-green; bunch, long and loose, berry medium to large, 3-8 to ½ inch, red, tenacious, firm and acid; season, medium; yield, 6½ lbs. One of the best commercial varieties.

Saunders: Planted 1897; bush, vigorous, upright spreading, hardy and productive; berry, black, large, ½ inch, sub-acid to sweet, fine flavor, season, medium; yield, 5 lbs. One of the best.

Versailles: Planted 1896; bush,, medium vigor, upright, hardy, and moderately productive; leaves, dark green; bunch, medium length, rather compact; berry, red, medium, 3-8 inch, acid; season, early to medium; yield 3 lbs.

White Grape: Planted 1896; bush, strong, upright-spreading, hardy and productive; leaves, light-green; bunch, long and loose; berry, white, large, ½ inch, sub-acid, pleasant flavor; season, medium to late; yield, 3 lbs. White currants do not sell so well as red or black on the general market.

White Imperial: Planted 1896; bush, moderately vigorous, upright-spreading, leaves, light-green; bunch, long and loose; berry, white, medium to large 3-8 to ½ inch, very sweet, fine quality; season, medium; yield, 2 lbs.

Wilder: Planted 1896; bush, strong, upright grower, hardy and productive; leaves, dark green; bunch, medium length, compact; berry, red, tenacious, medium to large, 3-8 to ½ inch, sub-acid of excellent quality; season, medium; yield, 5 lbs.

Healthy Growers.

In regard to health of the above varieties the following may be classified as sturdy and rugged bushes.

New Victoria, Red Dutch, Raby Castle, Red Victoria, Prince Albert, Pomona, Cherry.

The other varieties of red and white currants have a more or less red appearance in midsummer, and are more susceptible to fungus disease such as leaf blight.

The black varieties generally may be classified as healthy. Prices of currants this year ranged from 6 cents a quart for red currants to 10 cents for black.

*Note by Secretary.—We think Victoria and Raby Castle identical. Further test is required.

Undesirable Varieties.

Belle de St. Giles: Not productive enough.
Brayley's Seedling: Rather small berry and lacking in production.
New Victoria: Fruit too small,
Raby Castle: Too small for market.
Red Dutch: Too small.
Versailles: Fruit rather small.
White-Imperial: Scarcely productive enough.

A. E. Sherrington (*Lake Huron Station*).

The currant crop was excellent this year, both red and black, and the quality was all that could be desired; the fruit all sold at good prices.

Red Currants.

Cherry: Bush a poor grower, does not make wood enough; fruit large; quality good; color red; no fruit this season.

Fay's: Bush strong and vigorous, hardy and healthy; fruit very large; quality good; color red; ripe July 15th; yield 81 oz. per bush.

North Star: Bush of a spreading habit, canes small and weak; fruit, small and of poor quality; color red; ripe July 18th; yield 15 oz, per bush.

Prince Albert: A strong upright grower, vigorous and hardy, healthy, makes a fine compact bush; fruit medium to large; color red, quality good; yield, 48 oz. per bush a good one.

Pomona: Bush fairly vigorous, strong and compact; fruit medium to large, color red; quality of the best; ripe July 12th; yield 32 oz.

Red Cross: Bush vigorous and hardy; fruit large; color red; quality good; yield 22 oz. per bush, 2 years old.

Raby Castle: Bush very vigorous, strong and hardy, very productive; fruit small to medium; color red; quality good, but rather tart; ripe July 18th; yield 66 oz.

Versailles: Bush fairly vigorous, hardy and healthy; fruit large; color red; quality good; ripe July 15th; yield 52 oz. per bush.

Black Currants.

Black Victoria: Bush strong and vigorous, hardy and healthy; fruit large, quality good; ripe July 15th; yield 11 ounces per bush; four years old.

Champion: Plant a very strong and vigorous grower, hardy and healthy; fruit, large, black, quality good, ripe July 15th; yield, 56 ounces per bush

Naples: Plant a vigorous grower, hardy and healthy, and very productive; fruit large; color black; quality 1st class; ripe July 15th; yield, 66 ounces.

Saunders: Bush not very vigorous; fruit large; color black; ripe July 25th; yield 10 ounces.

Charles Young (*Algoma Station*).

Currants are satisfactory every way. The climate seems to suit them to perfection. Some varieties are under test and all are good. The whole

secret of success is plenty of barnyard manure; clean but shallow cultivation; cutting out the old wood; encouraging new wood, and keeping down the currant worm.

GOOSEBERRIES.

A. E. Sherrington (*Lake Huron Station*).

The gooseberry crop was the largest ever grown here; over 1,200 quarts were sold, realizing good prices. Downing and Pearl were the favorites; but so far as I can see there is no difference between them. The English varieties all mildewed so that they were worthless. Downing and Pearl each yielded about eight quarts per bush, and Red Jacket gave 4 quarts. The bush of the latter was only three years planted.

Chas. Young (*Algoma Station*).

Gooseberries have all done well; some six varieties are under test. Pearl, so far, has been the most profitable. The few English varieties I have are of poor quality; although the fruit keeps clean, the leaves sometimes show mildew. They are not profitable to grow at the same price per quart as Pearl; they are not so good in quality and there is nothing save their size to recommend them.

GRAPES.

M. Pettit (*Wentworth Station*).

We have at this station tested nearly 150 varieties of grapes, new and old. Very few of the newer are of much value; some of them have good points such as hardiness, vigor, and productiveness, but are entirely lacking in quality; while others may be of excellent quality, but entirely lacking in vigor and productiveness. In the early part of the season there was a prospect for an immense crop. The vines had passed through the winter in good shape, and made a vigorous growth.

The cool, cloudy wet weather through the early part of the summer caused the Brown rot, which seriously injured the Agawam, Niagara and Catawba. Nearly all varieties were subject to it. Lindley and Delaware suffered the least. Vines that had been sprayed with the Bordeaux Mixture once, soon after the fruit set, showed a marked difference in favor of spraying. Judging from the previous history of this disease, now that our vineyards are infested with the spores, a thorough system of spraying will have to be adopted, which will also be an effectual remedy for mildew.

All kinds of grapes were about ten days later than usual this season, and the later varieties were of very poor flavor, not enough heat or sunshine.

Commercial Varieties.

Champion: Was the earliest; the vines were heavily laden and it was one of the most profitable; first picking September 5th.

Moyer: Next in ripening, bore a heavier crop than usual and averaged a higher price than any other grape on account of its earliness; first picking September 10th.

Moore's Early: Also bore a full crop and sold at higher prices than usual; first picking, September 10th.

Delaware: Bore a heavy crop, and averaged higher prices than usual; first picking September 20th.

Lindley: A much heavier crop than usual and brought high prices; first picking, September 26th.

Worden: Bore a heavy crop; later than usual in ripening; fruit was injured with Brown Rot; price medium.

Niagara: Was very bad with the rot; flavor was poor; prices low; first picking, September 28th.

Salem: Promised a full crop but was badly injured with Brown Rot; sold at low prices.

Concord: Suffered considerable rot; flavor poor, price lower than usual; first picking, September 28th.

Agawam: Heavily laden; badly affected with rot; flavor poor, sour, not enough warm weather or sunshine to ripen it well; many vineyards did not ripen; price very low.

Catawba: Suffered the same as Agawam.

Some Grapes for the Home Garden Only.

The following are some varieties which are suitable only for the home garden, where quality is required more than quantity.

Winchell: A white grape; large, handsome shaped cluster; berries below medium size; very sweet; ripens early.

Black Delaware: A small black grape; long, compact clusters; excellent quality; vine is hardy, a slow grower, and not very productive, season about the middle of September.

Early Dawn: A small black grape; long loose clusters; excellent quality; not productive; season about 20th September.

Golden Drop: A small, light colored grape of excellent quality; a slow grower; not productive.

Jefferson: A red grape; handsome, compact clusters; crisp, sprightly, excellent flavor; a long keeper; season late.

Mills: A large, black grape; of good quality and one of the best long keepers; with ordinary care will keep in the baskets in a cool place three or four months and retain its sprightly flavor better than any other grape; season very late.

Cultivation.

I am still more convinced that shallow cultivation is better and cheaper than the usual amount of plowing done in vineyard cultivation, where the surface has been kept mellow and clean by shallow cultivation the results have been better than where much plowing has been done.

Pruning.

I have always adopted the fan system of pruning, but I find by making tests that the Kniffin system of pruning and tying is cheaper and answers as well for strong growing vines. The fruit can be gathered more readily and one wire less is required in trellising.

A. W. Peart (*Burlington Station*).

The grape crop here this year was very disappointing. They passed the winter in good condition, and the outlook for a good crop when in bloom, was never better. Early in August, however, many varieties were stricken

with rot. The vineyard on the clay loam suffered not more than 10 per cent. loss, while that on the gravelly loam was, upon the whole, depreciated probably 60 per cent. Worden and Niagara, especially suffered.

Commercial List.

The best commercial varieties here are: Worden and Concord for black; Delaware and Massassoit for red; and Niagara and Moore's Diamond for white.

Ripening was about two weeks later than usual. The vines are not protected here in the winter, but left on the wires.

Undesirable Varieties.

Moore's Early, Eaton, Lady, Eldorado, Brighton, Wyoming Red, Moyer and Winchell. None of these have proven money makers here.

Chas. Young (*Algoma Station*).

Grapes: We are too far north for this fruit. Nine varieties are under test. Many of them color up and look ripe every year, but try eating a bunch of southern grown grapes, and then try an apparently equally good bunch grown in Algoma, and your mouth will show the difference, even if you do not speak.

NUTS.

A. M. Smith (*St. Catharines*).

To the Members of the Board of Control:

Gentlemen,—By your instructions I secured from the purchaser of the Burrill farm, where we had our station for tender fruits and nuts, a few trees of Japan chestnuts and walnuts which I planted on my own place four years ago. I also had several seedlings of these nuts, obtained from Rochester, planted two or three years previous to this, and I thought a report of my success would be of interest to you and to the public. All of the walnuts have made a good growth, and one in particular which was planted seven years ago, made a remarkable growth, the trunk being over 6 inches in diameter and the branches extending 10 feet from the trunk each way. It has produced nearly a bushel of nuts this season. Several others have produced quite a number. The tree resembles the butternut in foliage, and the nuts are somewhat similar in appearance, though not so long in shape, and grow in clusters of from eight to thirteen in a bunch. When the outer shuck is removed it looks more like the English walnut, though the shell is much harder. The meat in taste is about a cross between that and a butternut. The tree is quite hardy and was not affected in the least by the extreme cold of last winter, though the English walnut and peach trees near by were, many of them, severely injured. I believe it will be a valuable tree for timber, if not for the nuts, on account of its rapid growth. I have planted about a thousand of the nuts, and if they grow they will be at your disposal, if you wish to experiment further with them.

In regard to the chestnuts, those obtained from the Burrell place, and which I believe had been grafted or budded, have not made very much growth, but seem to be of a dwarfish habit. They have borne some nuts—much larger than our native and I think about equal in quality—but the

tree is tender, one of them being killed and another injured last winter. Some seedlings imported from Japan seem to be much hardier, and the nuts are larger than our natives. I have an English walnut, grown from nuts raised in the states, which has borne two or three years, but it was injured some by the frost last winter and did not bear this year. I intend grafting it on the Japan, and will report results.

PEACHES.

Linus Woolverton (*Maplehurst, Grimsby*).

Notwithstanding the severe winter, the experimental peach orchard at Maplehurst came through without the slightest injury. The notes which I have taken during the past season on the fruits, other than cherries, in my collection, have been made for my work: "The Fruits of Ontario," and lack some of the details which should be given in an annual record. These minute details I will include in my notes next season, if it is considered desirable.

Alexander: My Alexanders ripened early in August and gave a heavy crop; but except where the fruit was thinned, and the trees highly cultivated, it was small and unprofitable.

Bowslaugh: Is so similar to the Longhurst, both in appearance and in flesh that we do not think it worth while to say more about it than that it is smaller in size and a trifle later in season than the latter, continuing fit for use this season until about the middle of October. It is an excellent canning peach, but in my opinion not profitable.

Carlisle: This is quite a new variety with us in Ontario, which has given me large crops of fine sized fruit for two seasons past. It is very late, coming in after the Smock is over. It requires a most favorable location in order to thoroughly ripen its fruit. This season I gathered it during the last half of October, and had some samples of it in November; but it was inferior in flavor to the fruit it gave the year previous when there was more sun, and the season was not so late. It was therefore somewhat disappointing this year on this account. In size it is the largest peach of its season, nearly equalling the Elberta, but it is flatter in form. The skin is green in color, which is against its sale; still its size should make it a profitable market peach, and in most seasons the flavor would be better than it has been this year.

Champion: This was the finest white-fleshed peach in my orchard; being very large in size and excellent in quality. In season it ripened with the last of the St. John and with the first of the Early Crawfords. The tree gave a very abundant crop of uniform size, which packed well in the six quart baskets, two tier deep, and took well in the market.

Crosby: Yielded a heavy crop of well colored fruit, desirable for the dessert table, but rather small for profit. The fruit dropped badly as soon as ripe.

Early Crawford: Was as usual the most desirable market peach of the whole season, and met with a sharp demand. The fruit was unexcelled in beauty and where assorted to size and packed two layers deep in the basket, presented a most attractive appearance.

Elberta: This peach easily held its place as the leading market peach of its season. The tree was not affected this season with curl leaf, to which it is subject other years, and it yielded abundant crops of large, highly colored fruit, ripening a week later than the Early Crawford.

Emperor: Bore with me for the first time; a very handsome late peach with yellow flesh and a colored cheek, medium in size, ripening even later than the Carlisle. I gathered it about the 20th of October.

Fitzgerald: Bore a heavy crop of fine quality peaches, yellow in color, quite similar to the Early Crawford, and nearly of the same season.

Greensboro: Bore its usual good crop of early fruit, which was harvested between the 15th and 20th August. The flesh is rather soft, but for a near market we would count it valuable, for it is a very good dessert peach. I think it worthy of test on a commercial scale.

Hale: Ripened about the 20th of August, and, though a peach long grown in our orchards, it still holds its place as a good market variety because of its fine size and color. Its great fault is that it is inclined to rot before it is fully ripe.

Hynes: Yielded a fine crop of most delicious dessert fruit, not very large, but good enough to make up for its small size. The fruit hangs well to the tree. We gathered it about the first week in September this season, which is about a week later than usual.

Jacques' Rareripe: My trees of this variety bore a moderate crop of very large yellow peaches, ripening just after the Early Crawford. For a near market we would think it valuable; it is too tender for long shipments.

Kalamazoo: Gave a good crop of yellow fruit, ripening in 1903 about the end of September, and this year during the first week in October. The tree is vigorous and productive, but the fruit is a little small to be a first class market peach.

Longhurst: Bore an abundant crop, and where the trees had high cultivation and manure, the fruit was of good size and fair appearance; but where poorly cultivated and not thinned, it was very inferior, and of little market value. The flesh is first class for table use or for canning.

Lewis: Came in just between Yellow St. John and Early Crawford and yielded an abundant crop of beautiful large round white fleshed fruit, with a fine red cheek. It is a splendid dessert peach, but a little tender for distant shipment.

New Prolific: Is another peach of the Early Crawford type, a little later, but quite tender in flesh. It is yellow, with a bright red cheek, and the flesh is very juicy with a sweet delicate flavor.

Rivers: As usual bore a heavy crop, but the fruit, though large in size is too delicate and too easily bruised to be desirable for shipping, neither is it possessed of very high quality; for these reasons it is declining in popularity as a market peach.

Smock: Was so late in ripening that the flesh did not acquire as good a flavor as usual, nor did the fruit reach its usual size and color.

Sneed: Ripened about the 26th of July, and was chiefly valuable because it had no competitor.

St. John: Bore its usual crop of very fine fruit, yellow in color, with a fine red cheek. When neatly packed in small baskets two layers deep, it equalled the Early Crawford in appearance and brought about equally good prices. This is a variety that should not be omitted from the commercial list for profit.

Triumph: A yellow fleshed peach, which has not proved itself very satisfactory. The tree is subject to leaf and twig blight, and the fruit to rot, so that it is fast losing its place among the profitable market varieties.

W. W. Hilborn (*Southwestern Fruit Station*).

In submitting my report for 1904, I will necessarily have to be brief, as all our experimental peach trees were either killed or so badly injured by last winter's frost that they had to be pulled out and burned. Again, as in 1899, the injury was in the roots. Nearly all peach trees on high, dry, sandy soil were destroyed in this locality. Those that escaped were grown on lower levels, and heavier soil, where the frost did not penetrate so deeply. Where the frost goes below the bulk of the roots the trees are usually killed. During the great part of the past winter we experienced steady cold, with very little covering on the ground. The trees came out in leaf and full bloom, and many set a crop of fruit and then died. However, as soon as the frost was out, the roots were found to be brown and dead. In many places the frost penetrated to the depth of five feet. If some practical method could be devised of protecting the roots during the winter, it would be a great boon to the fruit growers of Essex County. Cover crops do not grow vigorously enough under the branches of the trees to form sufficient protection. Straw would help if it could be obtained, but we have to go many miles and pay a high price for the few loads we require for bedding in the horse stables. If a cover crop could be found that would grow vigorously enough, with the aid of a little mulch material immediately around the trunk of the trees, the danger from root killing would be very much lessened. It has been suggested by some that we should experiment along the line of budding the peach on stocks that are more hardy. While that would be a good field for experiment, past experience would lead me to think that the top influences the root rather than the root the top.

I have a number of Wickson and Hale plums* budded on peach roots that came through the winter equally as well as the other plums budded on plum stocks.

The following list of twelve varieties are the most profitable for market among those tested at this station. They are named in their order of ripening, and give a continuous succession of fruit from the earliest to the latest, that is profitable for market:

Alexander,
St. John,
Brigden,
Early Crawford,
Fitzgerald,
New Prolific,
Engol,
Elberta,
Golden Drop,
Kalamazoo,
Banner,
Smock.

A. W. Peart (*Burlington Station*).

There were few peaches here this year. Although the trees generally are in fair condition, most of the fruit buds were frozen last winter.

Alexander,
Champion,
Greensboro,
Longhurst,
Sneed,
Triumph,
Crosby,
Golden Drop,
Yenshi,
Captain Ede.

Each of the above bore a few peaches; while there were none on the Crawfords, Steven's Rareripe, Tyhurst, Hortense Rivers, and Connecticut.

*From the plum tests made at some of our northern stations we have about concluded that the Japan plums are hardier than the European.—The Secretary.

A. E. Sherrington, (*Lake Huron Station*).

Peach trees were all killed out by frost last winter.

W. H. Dempsey, (*Bay of Quinte Station*).

The Triumph and Yellow St. John were killed to the ground, also seedlings of Crawford and Yellow St. John, planted in 1898. The trees of Bokhara are about half killed, while Fitzgerald is practically uninjured, except in the fruit buds, which were all killed.

PEARS.

L. Woolverton, (*Maplehurst, Grimsby*).

Having over 60 varieties of pears growing upon my grounds, planted there for purposes of study in connection with my work as your secretary, and in order that I may study the habits of the trees for my descriptive work in the Fruits of Ontario, it seems quite proper to make an annual report to this Board concerning their behavior each year. Thus, after a few years' experience with each variety, we shall be in a position to judge correctly of the respective merits of each, and to know which ones ought to be tested at various stations for proving their adaptability to various districts and locations. I will therefore give you notes upon a few of them this year and take fuller notes for future reports if you so order.

Bartlett: For market this pear excels all others in my district, being a general favorite for all purposes. I have about 1,000 trees in full bearing in my orchard. The fruit this year was large, clean and beautiful. The trees were fully loaded, the second year in succession. There was little if any blight, and, where this did show itself, it was among the upper limbs, so that the trees can be easily renewed from below. I shipped one car to Winnipeg, just previous to Prof. Reynold's experimental shipment, and it arrived in perfect condition and sold for fair prices. On the 8th of September I sent forward to Glasgow a car of nearly 900 cases of XXX stock, but I was intensely disappointed when I found that the lot had arrived over-ripe and had been sold at very low prices; especially considering that some of the same stock, held in cold storage in this country was still in perfect condition.

Bosc: I am much pleased with this pear. I have it top grafted on an old pear tree and the fruit is always of good form, of high quality and firm enough to export with perfect safety. Its color is that of russety yellow which is popular in the foreign market. I am top grafting a large number of my old pear trees with this variety for the export market.

Boussock: I have this variety as a standard and it yields large crops of very fine fruit. It is a good market variety.

Beurre d'Anjou: I have grown this variety for many years both as a dwarf and as a standard, and find it much larger and finer as a dwarf. I have exported this pear to Glasgow, wrapped in tissue paper and put up in half bushel boxes, and it uniformly brings the highest price in that market. In cold storage it easily keeps until January. The tree is fairly productive, and shows no indications of blight.

Diel: A fine export pear, green when gathered and yellowing toward maturity, late in autumn. I find it better as a dwarf than as a standard. It has high quality.

Brandywine: Is a very good pear, but not very profitable. I have it top grafted on old pear trees, and get a good crop almost every year.

Buffum: I have about a dozen large trees about 50 years planted, which have grown up like Lombardy Poplars. They are perfectly healthy without the slightest tendency to blight, and produce large crops of fruit. The pear is, however, too small for profit compared with other varieties of its season, which closely follows the Bartlett.

Clapp's Favorite: The finest market pear of its season, which just precedes that of the Bartlett. I have it on the quince and the fruit is magnificent. I have also exported it to Glasgow with good success.

Doyenne d'Ete: The earliest of all pears, and is very fine for the home dessert table, especially as grown on the quince. I do not, however, find it profitable as a market pear.

Giffard: I have this pear top-grafted upon old pear stock, and it has grown rapidly and given a fine yield every year. I have it also upon the quince stock, but I do not think it does any better than when grown on the pear, which latter of course makes the larger tree. The fruit is of good size, yellow with a red cheek, and it is the best early market pear we have.

Flemish Beauty: I have quite a large number of trees of this variety, most of them in full bearing. Usually the fruit scabs and cracks so badly that it is unmarketable. The season of 1903 was an exception, and the fruit was so clean and well colored that I was able to export a great part of my crop with success; but this year, 1904, it was again as badly scabbed as ever and entirely worthless, except on trees that had been well and thoroughly sprayed with Bordeaux. It is a pear of the highest quality, but as an export pear, even if clean, it is not very desirable, because if gathered on the green side it shrivels up, and if left hanging until fully ripe it becomes too soft to carry. I am top-grafting my Flemish Beauty trees to Bosc.

Goodale: Does not impress favorably as I have it in my experimental plot.

Hardy: An excellent autumn pear, smooth, clean and of uniform size. I have shipped it to Glasgow with my Duchess, and have about concluded to class it among the desirable export varieties.

Howell: I have grown this pear for many years, and find the tree a regular abundant bearer; the fruit is large, and it yellows as it begins to ripen, without softening. It has brought me a high price in the British market, and always reaches the consignee in good condition, which is a great point in its favor.

Josephine: I have always looked upon this as a most desirable winter pear, but since I have been fruiting it I have come to the conclusion that it is too small to bring much money and is therefore not very profitable.

Kieffer: Is the most productive pear in my orchard. Trees that are highly cultivated and manured, and the fruit upon them well thinned out, bear fine crops of large pears which are most attractive in appearance, being yellow in color with a beautiful red cheek. I had great hopes of this as a most valuable market pear, and planted largely of it, when it was being boomed; but have found it most disappointing. One season I put up a large quantity for the British market, expecting to make some money out of them, but met with disappointment. The pears turned black on the skin in transit and presented a very different appearance from that shown when they were being picked, and they sold for low prices. The quality too was so poor that the dealers reported that they could not place the pear a second time with the same buyers. It is esteemed by many as a canning pear, but of late our factories seem to prefer paying a higher price for Bartletts, rather than put up Kieffers. I am top-grafting my Kieffers to Anjou and Bosc.

Lawrence: Is my favorite dessert pear for early winter use, but I have not found it very profitable. The tree is fairly productive, but the fruit is often undersized; it also lacks color until stored a few weeks when it begins to yellow.

Louise: Has been fruiting in my orchard for over forty years, both as standard and as a dwarf, the latter succeeding best. This is the handsomest, and at the same time one of the most salable of our autumn pears, if grown on suitable soil and given first class culture. It has brought the highest price of any kind which I have shipped to the British market. In season it just precedes the Duchess, although I have shipped both of them to Great Britain at the same time. I have one tree remaining of the first orchard planted, a dwarf of over forty years of age, which has taken root above the quince stock, and has reached a height of about twenty-five feet. This year it bore about twelve baskets of very fine pears. The tree is growing on deep rich sandy loam.

Lawson: Has fruited with me for several years. The fruit is of great beauty, bright yellow with a rich crimson cheek; and of a large size, but I do not think it will be profitable because it rots at the core as soon as ripe, and will not carry; besides the quality is only ordinary. It is of about the same season as the Giffard.

Leconte: Has been fruiting for the past ten years with me, and I cannot say much in its favor. The fruit is of fair size, very clean and smooth, and ripens very late in the fall. This year the tree bore a heavy crop which I put up for export, but the pear lacks both color and quality, two very important characteristics in an export pear.

Manning: A very productive and very highly-colored summer pear of very good quality, but it is not large enough to compete in the markets with such an excellent variety as Wilder or Clapp's Favorite.

Mount Vernon: I have tested this pear for over 40 years, and consider it undesirable for any purpose.

Margaret: I have top-worked the Margaret on pear stock, and also I have it growing on quince stock, and find little difference in either growth of wood or in size of fruit. It is a fine dessert pear, but green in color and scarcely large enough to be a very profitable market variety.

Osband: I have tested this variety for thirty years. Once I looked upon it as the finest and most profitable early dessert pear, but, now that we have so many larger and better ones of the same season, I do not think it has any place in the commercial orchard. The fruit is small and the tree is only moderately productive.

Pitmaston: A variety which I found much grown in Kent, England, on the occasion of my visit in 1903, and it is there esteemed as superior for market to the Duchess, which is about same season. I have some trees in bearing in my experimental plot, and I am inclined to think it is likely to prove the most promising of all the newer varieties under test. The tree is a magnificent grower and very productive; the only fault being a slight inclination to blight. The fruit is large, smooth, clean and uniform in size: it yellows a litle earlier than the Duchess, without softening. The season of it is October and November. I am inclined to think we shall find this to be one of our most valuable export pears, especially as grown on quince stock.

Rostiezer: I have fruited this pear for the past thirty years and must commend it as the most desirable dessert pear of its season, which is just preceding the Bartlett. On account of its high quality it has received the name of the Summer Seckel. It is not a profitable market pear, however: it drops from the trees as soon as it ripens, and it quickly softens. I have tried every

way to get its proper value from buyers, shipping it as Summer Seckel, or adding under its own name the words "Dessert Pears," but it never has brought a good price, because it is too small, and too dull in color to please the eye.

Sheldon: A splendid dessert pear, of fair size, russet in color, and would be profitable if it were more productive. I have old trees of this variety, but they never yield crops in quantity sufficient to make it a profitable pear.

Superfine: A fine large pear of good quality as I have it growing on quince stock, but I have not yet tested it as a market pear.

Souvenir: A very large pear of striking appearance, but it lacks uniformity in size, and in shipe. The quality is not high. I have not tried it as a market pear.

Tyson: I have tested this pear for over 40 years. My trees are now about thirty feet in height, and they are remarkably vigorous and healthy; they have never shown the least tendency to blight, and they are quite productive each alternate season, with a light crop the intervening season. The fruit is above medium in size, well colored and of good quality. I do not, however, esteem it a very profitable variety, coming in as it does so near the season of the Bartlett, which it just precedes, and which admits of no competitor.

Seckel: In the old days this variety was counted a very valuable market pear because of its very high quality for dessert, but now larger pears of inferior quality seem to take its place for profit, unless in special sales. I find the fruit on standard trees to grow small and inferior, but on the quince I get good crops of high colored fruit, and large for the variety.

Vicar: I have fruited this pear for over thirty years, and have not found it profitable. It is a large winter pear, keeping until February in ordinary storage, but the color is a dull green and the quality is poor. My trees are also subject to blight.

I have thus given a brief account of the behavior during the past season of some of the more prominent varieties in my collection, in some cases based upon many years acquaintance with the variety. In future years, if your Board so orders, I will take notes for the preparation of a more detailed account of the varieties in my collection, showing their behavior each year.

HAROLD JONES, *(St. Lawrence Station)*.

Pears are proving as unsatisfactory as plums in the St. Lawrence counties, and can never be grown profitably in a commercial orchard. For garden planting there are only three varieties hardy enough to withstand the low temperatures we are apt to have, that are of good enough quality to recommend, viz.: Flemish Beauty, Clapp's Favorite and Ritson, and of these three Flemish Beauty should be given the preference as it succeeds very well even in exposed positions. Further tests may find a hardy pear of good quality that does not spot as badly as Flemish Beauty, but this trouble can be controlled by careful spraying.

Bartlett Seckel: One tree planted 1898, dead in the spring of 1904; winter-killed.

Beurre Clairgeau: Three trees planted 1896, not hardy, injured to some extent every winter and killed in the spring of 1904. Top grafted on Bessemianka, it is more hardy but shows injury this spring.

Baba: Two trees planted 1897, died of blight in 1900.

Bessemianka: Three trees planted 1896: hardy and vigorous, bears annually, but fruit is worthless.

Bergamot: Three trees planted 1896, tree in ordinary seasons quite hardy, but fruit small and inferior, last winter it was seriously injured.

Beurre Hardy: Three trees planted 1896; tree has proved quite hardy up to last winter, when it was seriously injured; fruit buds tender.

Clapp's Favorite: Three trees planted 1896; healthy and hardy and gave some fruit of fine quality in 1903; slightly injured last winter, but promise of recovering; no fruit this year.

Cherburn, (Russian): One tree planted 1896, fruited in 1903; fruit of poor quality; blighted in summer of 1903; dead in spring of 1904.

Dempsey: Three trees planted 1896. Fairly healthy and hardy until last winter, when it was severely injured.

Eastern Bell: One tree planted 1898; dead in the spring of 1904.

Flemish Beauty: Three trees planted 1896; hardy and healthy; fruit buds tender on seven years; fruited in 1903, no fruit this year; tree not injured by the winter of 1904; one of the most desirable varieties for this district.

Goodale: Three trees planted 1896; fairly hardy and healthy up to last winter when it was severely injured; bore some fruit in 1902 and 1903, but they were small and inferior specimens.

Japan Golden Russett: Three trees planted 1897; fruited in 1901, fruit of poor quality; undesirable; winter-killed in 1904.

Howell: Three trees planted 1896; fruited in 1900 a few specimens; tree tender, died in 1903.

Idaho: Three trees planted 1896; trees suffered with blight and died in 1903 and 1904.

Kieffer's Hybrid: Three trees planted 1896; this was very promising for a few years giving me some nice fruit in 1900, 1901-2 and 3, but the trees were severely injured last winter and will die.

Lincoln: Three trees planted 1896; injured in 1903 and killed in 1904.

Lincoln Coreless: Three trees planted 1896; tender; blighted in 1903; killed in 1904.

Le Lecture: Three trees planted 1897; fairly healthy and vigorous until last winter when it was killed.

Petite Marguerite: One tree planted 1898; injured in spring of 1904.

Ritson: Three trees planted 1896; healthy and vigorous, has borne fruit for two years past, and one tree had three pears this year; trees slightly injured this spring.

Sudduth: One tree planted 1896; a round headed, moderately vigorous tree, bore fruit in 1903 of inferior quality; no fruit in 1904 and tree slightly injured.

Varonish: One tree planted 1896; a Russian variety of poor quality; bore a few specimens in 1903 and died of blight.

Victorina: Two trees planted 1896; a Russian of vigorous growth; blossomed in 1904 for the first time, but did not set fruit.

Vermont Beauty: Three trees planted 1896; a vigorous grower, but tender, showed injury in spring of 1903; dead spring of 1904.

Winter Pear: Three trees planted 1896; a Russian of vigorous growth; fruit of poor quality; useless.

Wilder: One tree planted 1898; dead in spring of 1904.

Undesirable Varieties for St. Lawrence District.

Bartlett, Seckel, Beurre Clairgeau, *Bessemianka, Bergamot, Beurre Hardy, Cherburn, Dempsey, Goodale, Japan Golden Russett, Howell, Idaho,

*Bessemianka is good stock to top graft on.

Lincoln, Lincoln Coreless, Le Lecture, Varonish, Vermont Beauty, Winter Pear.

A. W. Peart, (*Burlington Station*).

Pears were a fair crop of rather poor quality. Such varieties as the Duchess spotted worse than usual. Most of the kinds were rough and pitted, owing, probably, to the curculio bite. Blight also was quite prevalent, Howell, Buffum, Clapp's Favorite, Easter Beurre, and President Drouard suffering more especially. Conditions which produce a firm, but only moderate growth of wood, seem favorable to check blight.

Commercial List.

Wilder,	Duchess, (dwarf),
Clapp's Favorite,	Anjou,
Bartlett,	Keiffer,
Boussock,	Winter Nelis,
Louise,	Easter Beurre.

Anjou: Planted 1890. Tree, spreading, strong grower, hardy, stocky, productive and handsome; fruit, season, November; lacks tenacity; a good export pear.

Bartlett: Planted 1890. Tree, upright, moderate grower, hardy and very productive; inclined to blight; fruit, season, early September: with efficient cold storage a very profitable export pear.

Bartlett Seckel: Planted 1898; tree a spreading, moderate grower, some blight; fruit, small to medium, resembles a small Clapp's Favorite in shape and appearance; fine in grain, sweet and juicy; season, early September.

Bosc: Planted 1896; tree upright, vigorous, hardy and productive with age. A good export pear; season, October.

Giffard: Planted 1896; tree very spreading, vigorous, hardy and productive; fruit, season, early August.

Buffum: Planted 1897; tree strong, hardy, upright; subject to blight; fruit, season, September.

Clairgeau: Planted 1896; tree upright, hardy, moderate grower; fruit lacks tenacity; a good export variety; season, November.

Clapp's Favorite: Planted 1896; tree an upright, spreading, vigorous grower, hardy, productive, tendency to blight; fruit season, last of August. A good early commercial pear.

Dempsey: Planted 1898; tree, an upright, moderate grower; no fruit yet.

Doyenne Boussock: Planted 1896; tree a spreading, moderate grower, hardy, fruit, season, early September.

Duchess: Planted 1890; as between the dwarf and standard Duchess, we prefer the dwarf, as being more productive, and bearing larger fruit. Tree upright, hardy, moderate grower; fruit, season, October; one of the best export pears; when grown as a dwarf should be well cared for.

Easter Beurre: Planted 1897; tree, spreading, very vigorous, hardy and sturdy; branches somewhat wild and straggling; fruit, season, winter; will keep until Easter; this pear is subject to blight, and the fruit lacks tenacity.

Flemish Beauty: Planted 1880; tree spreading, vigorous, hardy and very productive; fruit, much subject to scab and almost useless; season, September.

Howell: Planted 1896; tree, upright, hardy, vigorous, productive, but subject to blight; fruit, season, late October to early November.

Idaho: Planted 1896; tree an upright, moderate grower, hardy and subject to blight; fruit, medium to large, roundish, of poor quality; season, early November.

Josephine de Malines: Planted 1896; tree, spreading, moderately vigorous, hardy, productive, tendency to blight; begins to fruit young; season, early winter.

Kieffer: Planted 1899; tree, upright, strong grower when young, hardy and very productive; fruit, variable in size, from medium to large, ovate, when freely ripe melting, very juicy, with a quince flavor. Season, November; a good canning pear, when quite ripe; a profitable export pear; should be grown on light soils.

Lawrence: Planted 1896; tree, a hardy, spreading, vigorous grower; fruit, season, early winter.

Lawson: Planted 1896; tree, upright, hardy, moderately vigorous, tendency to blight; fruit, medium size, 3x3 1-2 inches, roundish pyriform, yellow skin, with bright red cheek, quality fair; season, middle of August.

Lincoln: Planted 1898; tree, upright, vigorous, hardy; fruit, small to medium; resembles Josephine de Malines; fair quality; season, last of September.

Louise: Planted 1897; tree, hardy, spreading, moderate grower; fruit, season, late September.

Osband's Summer: Panted 1897; tree, somewhat spreading, hardy, moderately vigorous; fruit, season, August; some blight.

Petite Marguerite: Planted 1896; tree upright, vigorous, some blight; fruit, small to medium, obovate, melting, juicy and agreeable; season, late August.

President Drouard: Planted 1897; tree, a spreading, moderate grower; blights badly; fruit, season, mid-autumn.

Seckel: Planted 1897; tree, spreading, hardy, compact top, moderate grower; fruit season, late September.

Sheldon: Planted 1889; tree, strong, vigorous, hardy, upright,, some blight; fruit, season, October. Have not exported this pear with any success.

Souvenir de Congres: Planted 1896; tree, upright, fairly vigorous, hardy; fruit large to very large; shaped something like the Bartlett; quality good; season, late August to early September.

Sudduth: Planted 1897; tree, spreading vigorous, hardy, productive; fruit small to medium, green, roundish, thick in skin, soft, coarse flesh or poor quality. Of no value here; season, October. Looks like a walnut.

Summer Doyenne: Planted 1896; tree, upright, vigorous, hardy grower; fruit, season, early August.

Tyson: Planted 1897; tree, upright, hardy, vigorous grower; no fruit yet.

Vermont Beauty: Planted 1896; tree, spreading, vigorous, hardy, and shapely in appearance; no fruit yet.

Wilder: Planted 1896; tree, an upright, vigorous, hardy grower; not so productive as the Giffard, but of better quality; season, middle of August.

Of the eleven varieties of French pears planted here in 1900, one, Bergamotte Esperen, is dead, the others are growing well.

Undesirable Varieties for Wentworth County

Buffum: Too small for profit. Blights badly.

Flemish Beauty: Spots too badly.

Idaho: Tree blights badly. Fruit not of good quality. Lacks also productiveness.

Petite Marguerite: Too small for profit.

President Drouard: Tree very subject to blight.

Sudduth: Fruit small and of very poor quality.

Summer Doyenne: Fruit too small for profit.

Size and appearance of pears, as well as quality, count for much, under present market conditions.

CHAS. YOUNG, (*Algoma Station*).

I cannot report much success with pears. Until last winter nearly all had made a satisfactory growth, but yielded very little fruit.

Kieffer: Bore heavily in 1903, but the fruit was small and poor.

Bessemianka: A Russian, bore fair sized fruit which rotted as fast as it ripened. Flemish Beauty had a few samples, but of inferior quality.

Goodale and Anjou, with the Russians, have come through the winter untouched. Keiffer with more injured than any of the others, but now were completely killed. I do not think pear growing here will be a commercial success, and unless for the satisfaction of growing a few for home use, I would not advise planting them.

W. H. DEMPSEY, (*Bay of Quinte Station*).

Pear trees were very much weakened from the effects of Pear Psylla last year, together with the extreme cold weather. The trees thus affected did not make as strong growth as usual, and bore very little fruit.

Kieffer: Was but slightly damaged and bore a heavy crop, but the fruit was small, and the quality was not as good as those grown further south where the season is longer.

Bosc, Hardy, Boussock, Goodale, White Doyenne and *Howell* seem to be equally affected by Psylla, and where the trees were bad, they were more or less injured in the fruit buds.

The trees not affected bore fair crops of fine fruit.

A. E. SHERRINGTON, (*Lake Huron Station*).

Pears were a failure at the station this season; none of the trees in the experimental plots fruited. The most of the trees came through the winter all right, except a few of the French pears planted a few years ago. Those killed were frozen to the snow line, the stocks were grafted in the spring, so no varieties were lost. Some young Kieffers planted one year ago were also killed.

J. G. MITCHELL, (*Georgian Bay Station*).

I am pleased to again report favorably on pears. They wintered quite as well, if not better than apples. The following varieties seem well adapted to this district, Bartlett, Beurre d'Anjou, Clairgeau, Duchess, Boussock, Flemish Beauty, Clapp's Favorite, Bartlett-Seckel, Seckel, Louise Bonne, Howell, Kieffer, Winter Nelis, and Belle Lucrative. These varieties all fruited fairly well this season, which shows they are all hardy enough to stand the severest climatic conditions we are ever likely to have. Besides those, there are quite a number of others which promise well. The young pear trees brought from France are doing nicely, and seem quite adapted to this country, having wintered as well as any, but they are too young to fruit yet.

PLUMS.

J. G. Mitchell, (*Georgian Bay Station.*)

European.

Arch Duke: One of the most hardy and least affected by the winter, bore quite a sprinkling of fine plums.

Bradshaw: This fine, large handsome plum may be classed among the hardy varieties. None wintered better and no trees of this variety were lost.

French Damson: Hardy, came through last winter fairly well and fruited.

Gueii: The only variety which bore a full crop this season.

Glass Seedling: Trees hardy and healthy but not productive this season.

Hughes: Very much like Yellow Egg, only it produces larger fruit. This variety also wintered well.

Prune d'Agen: The only prune on the grounds to bear any fruit this season. This plum, although not so large as German Prune, is about as good in quality; it is an annual bearer and the tree is more hardy than the German Prune.

Lombard: Bore more fruit than all the others together; but it rots badly some times.

The above varieties are the only ones that bore anything to speak of this season.

Coe's Golden Drop, Reine Claude and Burgundy Prune were all killed last winter.

Japan Plums.

These plums are now proved to be quite as hardy as the European varieties, though they bore no fruit this season. There was only one variety lost, the Wickson, the trees of which were all killed by the frost last winter. The quality of the Japan plums is against them as compared with the European that ripen at the same time. The following are the only varieties of them I would plant, viz.: Red June, Burbank, Satsuma and Chabot.

Undesirable Varieties for Grey County.

Admiral De Riany,
Becksley,
Berckmans,
Brunswick,
Czar,
Copper,
Communion,
Chas. Downing,
Comfort,
Cheney,
Forest Rose,
Golden Cherry,
Hattankio,
Hammer,
Hungarian Prune,
Milton,
Maru,
Normand,
Ogan,
Orange Prune,
Pottawattamie,
Saunders,
Tatge,
Ungarish,
Willard,
Wild Goose,
Wolf,
Whitaker,
Wyant,
Youkin's Golden,

and to these might be added General Hand for its poor bearing.

HAROLD JONES, (*St. Lawrence Station*).

Plums in the St. Lawrence counties are never likely to be of any commercial value to the growers. Nearly all the best varieties of the European type are tender, and the varieties that will succeed are uncertain croppers, owing to injury to the fruit buds. For planting in gardens for home use in this class, Gueii, Glass Seedling, Lombard and Shipper's Pride have, on the whole, proved the most hardy, but have not yielded enough to make them of much value.

Among the Japanese plums Maru, Ogon and Red June have been fairly hardy, and the only ones so far tested that have produced fruit, with the exception of Burbank, which bore two plums in 1900.

Plums of the American type are found to be the hardiest and will give fruit of fair quality when others fail. Many varieties are of poor quality, but Milton, Whitaker and Hammer are among the best so far tested.

Abundance: Three trees planted 1897; this variety has never proved of any value here, being tender in fruit bud; trees severely injured and nearly dead in the spring of 1904.

Blood No. 4: Three trees planted 1898; tender in wood and fruit bud; two trees killed and one injured this spring.

Berckmans: Two trees planted 1898; tender in wood and fruit bud: this spring.

Burbank: Two trees planted 1899. A few blossoms developed fruit in 1900; no bloom since; one trees dead and one injured this spring.

Col. Wilder: Two trees planted 1897. A hardy vigorous grower, blossomed and bore fruit every year since 1899; fruit small, bright red, clingstone of poor to medium quality.

Chas. Downing: Three trees planted 1896; tree hardy but subject to a disease similar to plum pocket; fruit bud somewhat tender; bore some fruit in 1901 and 1903: not desirable.

Communia: Three trees planted 1896; tender in wood and fruit; dead this spring.

Coe's Violet: Two trees planted 1898; tender, slightly injured every winter; dead this spring.

Chabot: Two trees planted 1899; not hardy; dead this spring.

Deaton: Three trees planted 1897; not hardy; dead this spring.

Field: Three trees planted 1897; tender in tree and fruit bud; severely injured this spring.

Forest Rose: Three trees planted 1897; tree a very rapid grower, wood soft and apt to break down, hardy in wood and fruit bud, blossoms profusely and bears moderate crops of medium sized, dull red fruit, thick skinned, fair for cooking, season, September 5th.

Forest Garden: Three trees planted 1897; trees weak in growth; wood subject to winter injury; fruit bud hardy, fruit not desirable; trees dead this spring.

Gueii: Three trees planted 1896: trees hardy and vigorous, foliage large and healthy; fruit buds partly injured every winter; bore some fruit this spring, but it was destroyed by plum rot in June.

Green Gage: Three trees planted 1897; blossomed in 1900, no fruit; injured in 1903 and dead this spring.

Gold Plum: Three trees planted 1898. Blossomed in 1901 and bore 5 fruits that came to maturity; injured in 1903; 2 trees dead in 1904.

Grand Duke: Three trees planted 1897; more or less injured every winter; dead spring of 1904.

Glass Seedling: Three trees planted 1897. A hardy tree of moderate growth, develops fruit buds slowly; a few blossoms this year, but no fruit came to maturity.

Hughes' Seedling: Three trees planted 1896; has been a fairly vigorous tree up to last year, but badly injured in spring of 1904 and nearly dead.

Hammer: Three trees planted 1896; a hardy, vigorous, healthy tree, bears every year medium crops; fruit medium, dull red with gray dots, skin tough, but not astringent, fair for cooking; ripens late in September.

Hattankio: Two trees planted in 1899; tree tender; killed in spring of 1904.

Kelsey: Two trees panted 1899; tree tender, killed in spring of 1901.

Lincoln: Two trees planted 1897; tree hardy, slow grower; slow to come into bearing.

Lombard: Three trees planted 1894; tree a vigorous, healthy grower; bore a heavy crop in 1898; fruit buds tender in most years; slightly injured in tree this spring.

Lombard Improved: One tree planted 1898, tree dead spring of 1903.

Large Golden: One tree planted 1898; tree injured every winter; dead spring of 1904.

Muir: Three trees planted 1899; tree injured every year; dead in spring of 1904.

Milton: Three trees planted 1896; a hardy, vigorous, spreading tree; fruit buds injured some years; a few fruits developed this year; fruit medium, bright red; quality poor; ripens early August.

Maru: Two trees planted 1899; tree hardy, upright, vigorous; blossomed this spring and a few specimens developed, but did not come to maturity.

Moore's Arctic: Three trees planted 1896; trees were healthy, vigorous growers for a few years, but bore no fruit; killed in spring of 1904.

Montreal: Three trees planted 1896; trees have not proved vigorous growers; were severely injured last winter and will die.

Normands: Three trees planted 1898; trees injured every winter; dead in spring of 1904.

Raynes (Dunlop's Seedling, No. 53): Planted 1901; a vigorous, healthy grower; no injury to wood last winter.

Mount Royal (Dunlop's Seedling, No. 54): Planted 1901. A healthy tree of slow growth; no injury to wood last winter and shows development of fruit buds.

Ogon: Two trees planted 1899. A hardy, vigorous, upright grower; fruit buds slightly injured last winter; some fruit developed, but did not come to maturity.

Pond's Seedling: Three trees planted 1896; trees injured every winter; dead in spring of 1904.

Prince of Wales: Three trees planted 1897; trees injured in spring of 1904.

Red June: One tree planted 1899; tree vigorous and healthy; no injury to tree last winter; bore a few fruits that came to maturity.

Satsuma: Two trees planted 1899; trees injured to some extent every winter; killed spring of 1904.

Shipper's Pride: Three trees planted 1897; trees fairly hardy, partly injured in spring of 1904, but a few blossoms developed fruit that ripened the first week in September.

Saunders: Three trees planted 1896. Apparently hardy in most seasons; killed in the spring of 1904.

Smith's October: Three trees planted 1899; winter-killed in 1903.

Tatge: Three trees planted 1896, bore one crop of fruit in 1900; winter-killed in 1904.

Whitaker: Three trees planted 1896, hardy and vigorous; came into bearing in 1900; have borne medium crops annually; fruit medium size, color light red, thin skinned, quality fair to good; ripe about September 5th; for canning, one of the best so far tested.

Weaver: Three trees planted 1896; a hardy, vigorous tree, but an uncertain bearer; fruit of poor quality, not as good as Hammer and Forest Rose, which ripen at the same season.

Wolf: Three trees planted 1897; a hardy, close, compact tree; very subject to attacks by aphis; fruit small to medium, color, red; of fair quality.

Wyant: Three trees planted 1897; tree and fruit somewhat similar to Wolf.

Wickson: Three trees planted 1899; tree tender; killed in spring of 1904.

Yellow Egg: Three trees planted 1897; fairly hardy in ordinary seasons, but severely injured in 1904 and will die.

Summary of Report on Plums for 1904.

Winter killed.	Severely injured.	Slightly injured.	Not injured.
Blood No. 4.	Abundance.	Chas Downing.	Col. Wilder.
Berckmans.	Burbank.	Lombard.	Forest Rose.
Communia.	Forest Garden.	Milton.	Gueii.
Coe's Violet.	Hughes' Seedling.	Shipper's Pride.	Glass Seedling.
Green Gage.	Montreal.		Hammer.
Gold.	Tatge.		Lincoln.
Grand Duke.	Yellow Egg.		Maru.
Hatankio.			No. 53, Dunlop's Seedling.
Kelsey.			No. 54, Dunlop's Seedling.
Lombard Improved.			Ogon.
Large Golden.			Red June.
Muir.			Whitaker.
Moore's Arctic.			Weaver.
Normands.			Wolf.
Pond's Seedling.			Wyant.
Satsuma.			
Saunders.			
Wickson.			

Undesirable Varieties for the St. Lawrence District.

Abundance,
Blood No. 4,
Burbank,
Berckmans,
Communia,
Chabot,
Charles Downing,
Coe's Violet,
Forest Garden,
Green Gage,
Gold,
Grand Duke,
Hughes' Seedling,
Hatankio,
Kelsey,
Lombard Improved,
Large Golden,
Muir,
Montreal,
Moore's Arctic,
Normands,
Pond's Seedling,
Satsuma,
Saunders,
Tatge,
Wickson,
Yellow Egg,

A. W. Peart, (*Burlington Station*).

There were very few plums here this season, the buds being destroyed by the severe cold of last winter. A leaf blight swept over most of the European varieties the latter part of summer, entirely defoliating them. Of some thirty kinds the Niagara, Bradshaw, and Glass Seedling were the most resistant. The Japan varieties, however, retained their leaves to the usual season.

Leading European Plums.

Of this class the Bradshaw, Niagara, Lombard, Glass Seedling, Reine Claude, Yellow Egg and Imperial Gage take the lead here.

Leading Japan Plums.

Among the Japans, the Red June, Abundance, Burbank, Chabot, Satsuma stand at the front.

Undesirable Varieties for Wentworth County.

Weaver, Fellemburg, Mariana, Czar, Shropshire Damson; none are profitable.

A. E. Sherrington, (*Lake Huron Station.*)

It was in plums that we met with the greatest loss from the severe winter. The crop was not only a total failure, but a large number of trees were killed; the varieties that suffered the worst* were: Lombard, Moore's Arctic, and Grand Duke; these were all killed out-right. The varieties that were more or less injured, were: Monarch, Prince Englebert, Lincoln, Victoria, and Imperial Gage. Satsuma was the only Japan variety that was damaged, one tree being killed. It seemed strange that one tree out of three of a variety should be killed and the other two not injured, but this happened in several cases. The only variety to fruit was the Red June, which produced a few plums.

G. C. Caston, (*Simcoe Station.*)

In my former reports I have mentioned the Staunton as the hardiest of European plums I had tested. It came through last winter with only the loss of the fruit buds, but the tree is still healthy and sound. Of the Japan plums, Burbank came through with the loss of the fruit buds only. Some of the Abundance and Red June were killed. Ogon, Shense, Willard and Satsuma are either killed or so badly damaged as to be of no further use.

The American varieties that I have came through fairly well, but they are not worth growing. There was practically no plums in this section this year. Where the trees were not killed outright the fruit buds seemed to have perished from the intense cold. Plum growing as a commercial venture would be a doubtful enterprise in this immediate locality. We are too far from the large bodies of water.

*Possibly these trees which suffered most from the winter had been previously weakened through over-production of fruit the previous summer.—Secretary.

CHAS. YOUNG, (*Algoma Station.*)

If any one in the fall of 1903 had asked me what plum I preferred above others I would have said Red June; now in the spring of 1904 Red June are nearly all killed. I may class this along with the Ontario apple as a disappointment. The only varieties that have proved too tender in ordinary winters here are America and Wickson. I still prefer the hardier varieties of Japan plums to any others, but I am beginning to see the good qualities of the American plums. Perhaps their defects were more observable in the beginning, before they fruited, and if we could only get them with less resemblance to the native wild plum, they might take the place of all others in the north. Burbank and Ogon among the Japans have done best with me; some others as Gold have made satisfactory growth but yielded litle fruit. European plums may be fairly satisfactory for some years, but a tree may carry a good full crop one year and next year, from no apparent cause it is found dead. All European plums suffered slightly last winter; Reine Claude was killed outright.

W. H. DEMPSEY, (*Bay of Quinte Station.*)

The Japan plums suffered from the severe winter. Every fruit bud on Burbank, Abundance and Wickson were dead, also the wood killed back some, while Chabot was uninjured and bore a fine crop of fruit, it is very subject to rot before ripening.

The Saunders fruited heavily, and were fine, followed later by fair crops from Reine Claude de Bavay, Shipper's Pride, McLaughlin, Niagara, and De Soto, while the Damson produced a very heavy crop.

RASPBERRIES.

A. E. SHERRINGTON, (*Lake Huron Station.*)

The raspberry crop was very good considering the way the canes were broken down by the weight of snow, and weakened by the frost. The quality was very fine although the yield was not equal to last season.

RED RASPBERRIES. (Yields given from 20 ft. of row.)

Brandywine: An early red variety; canes small and weak, hardy and healthy fruit small and soft; yield 39 ounces; first picking, July 13th; last picking, August 4th.

Cuthbert: This old variety still stands at the top of the list as the best all round berry grown; plants very strong and vigorous; healthy, and hardy enough to produce paying crops; fruit large; color red; quality, best; ripe July 21st; last picking, August 15th; yield, 375 ounces.

Harris: This variety has done nothing here; has only made about a foot in growth, and has not fruited yet; it is perfectly useless.

Loudon: This variety has done much better this season than any year since planted, the plot in the experimental grounds failed entirely, but those in the field did very well this season; the plant came through the winter in good condition; fruit large, and of very good quality, not so firm as Cuthbert.

Marlboro: Canes strong but lacks vigor; healthy and hardy; fruit large and firm; color bright red; quality good; ripe July 14th; last picking, August 6th; yield 99 ounces.

Miller: Canes rather small and weak; hardy and healthy; fruit small to medium; color red; quality only fair; first picking, July 13th; last picking, August 6th; yield, 121 ounces.

Phoenix: Plants vigorous enough to make a good row; healthy, and very hardy; fruit large, firm; quality good; color, bright red; ripe July 13th; last picking, August 15th; yield 432 ounces, a good variety.

Reliance: An early red berry of fair quality; good for near market or home use; plants hardy, and vigorous enough to make a good row; fruit, medium, color, bright red; first picking, July 13th; last picking, August 4th; yield, 309 ounces.

Turner: This is another early red variety; plants very hardy, fair grower; fruit small to medium; value, 1st class for home or near market; too soft for shipping; first picking, July 13th; last picking, August 6th; yield 160 ounces.

Thompson: Canes small and weak; lack vigor; fruit small to medium; soft, of only fair quality; color red; ripe July 13th; last picking, August 4th; yield, 112 ounces.

Of the Red Raspberries.

The three best early varieties are, Marlboro, Turner, Reliance.

The three best medium to late varieties are, Cuthbert, Phoenix, and Loudon.

Black Raspberries. (Yields from 6 plants of a kind.)

Conrath: A strong, vigorous grower, but a little tender; fruit large, quality first-class; ripe July 16th, last picking, August 16th; yield 149 ounces; one of the best.

Hilborn: Plant very hardy and healthy, strong and vigorous; fruit large quality good; ripe July 23rd, last picking August 6th; yield 154 ounces; one of the best.

Older: Canes rather small and trailing, but hardy and healthy; came through the winter in perfect condition, being completely covered with snow; fruit large, quality good; 1st picking, July 16th, last picking, August 4th; yield, 233 ounces; a profitable variety.

Other Varieties of Raspberries.

Caroline: A strong grower, hardy; fruit small and soft; color yellow; ripe July 7th; not worth cultivation.

Columbia: Plants strong and vigorous, rather tender, habit of black caps; fruit large, quality fair; color, purple; ripe July 11th; last picking, August 16th; yield 112 ounces.

Strawberry-Raspberry: Plants do well here, and there is a growing local demand for the fruit; fruit large; color bright red; quality poor, only fit for canning; ripe July 25th; yield 52 boxes from a plot 4 feet wide by 20 feet long.

Undesirable Varieties for Bruce County.

Brandywine, Caroline, Columbian, Gregg, Miller, Thompson.

G. C. Caston, (*Simcoe Station.*)

The Cuthbert is still the leading variety here. Its chief fault is that it is not sufficiently hardy. It kills back in the tips every winter. Last winter it killed down to a few inches below the snow line. Had it not been for the great depth of snow, there would have been no bearing wood left this year. However, owing to this protection there was enough live wood left to produce a medium crop.

Marlboro stood the winter fairly well. It requires good strong soil or liberal fertilizer, but the quality is rather poor. As an early berry the first to ripen; it fills a place until Cuthberts begin to ripen.

Miller and *Loudon* have proved to be quite hardy. These were growing on sloping ground with a northwestern exposure, and came through without the loss of an inch of bearing wood. Neither of them came up to Cuthbert in productiveness, but the berries are of good size and fair quality. They are both slow growers and do not seem to sucker freely so that they propagate slowly. But they can be depended on for hardiness, and on rich soil might be the most profitable kinds to grow here or farther north. I have discarded Black Caps entirely. There is really no market demand for them. Very few people ever ask for them. The demand is for a red berry, large, and of good quality.

Chas. Young, (*Algoma Station.*)

Raspberries have been fairly successful. Nine varieties are under test. *Cuthbert* keeps growing into winter and gets frozen back; otherwise it is a very fine berry. *Marlboro* is very large but fruit is crumbly. *Loudon* with me comes nearest to a perfect berry on account of its hardiness; but for an amateur who wants to grow a few berries for his own table, nothing equals *Brinckle Orange;* it is quite true that it is tender and when the snowfall is light, needs to be laid down and covered up; but here, where the snow comes heavy and lays on the ground all winter, it requires no covering; the tips will get frozen, but the plant has a faculty of throwing out side shoots that will produce a full crop of berries, which no other kind can approach in quality. Black Caps are open to the same objection as black berries; they break down under the weight of snow. Anyhow, there is no demand for them.

A. W. Peart (*Burlington Station*).

The crop was scarcely up to the average. Prices were good.

Leading Varieties.

These take the lead: *Red*, Marlboro, hardy, large, productive, firm and early; Cuthbert, healthy, vigorous, large and productive, medium to late; *Black;* Kansas, Hillborn and Smith's Giant; *White*, Golden Queen. The *Marlboro* is probably the most satisfactory red raspberry grown here. It is a somewhat light grower, so that it should be carefully manured and cultivated. One great advantage it has lies in the fact that the berries are not hidden, the pickers can see them.

STRAWBERRIES.

Rev. E. B. Stevenson, (*Strawberry Station*).

I have to begin my report this year with a somewhat similar observation to that in the commencement of last year's report. The season 1904 could not be considered a normal one, and this is true of the last few years. Our strawberry seasons have been so much out of what we consider an ordinary or normal season, that our report on the different varieties as to their conduct the past season would not be a true criterion of their value. Some of our standard varieties made a very poor showing this year, owing to the unfavorable circumstances: so that the season of 1904 must be considered as very unsatisfactory from the strawberry standpoint. The yield was in most places light, the season short, quite late in beginning, and delayed by wet, cool, cloudy weather. In many places the plants suffered very much from the severity of the winter, some plantings losing one third. Many plants were killed outright; in some sections the beds were ploughed up. I believe a good deal of the bloom of this season was from secondary buds developed in the crowns after those first prepared by the plant for fruiting has been killed by the frost. Many of the blossoms were quite small and appeared to have little pollen; some of the berries were not well fertilized, as was evidenced by their imperfect shape. Last year the plants made a good growth, but developed some rust; generally, they went into winter quarters in good shape. We had a good covering of snow about the 17th of November, which was added to as the year advanced. The very severe weather in February, when the plants were bare for a time, was very hard on the plants, and I believe it was then that the most of the damage was done to the plantations. Two years ago we had late frosts, injuring the crop. Last year quite a percentage was destroyed by successive frosts in May, and the severe winter of 1903-4 brought about the same results, a very much diminished crop. Where the plants were heavily mulched they came through the winter in fair shape. As I have said the fruiting season was late and quite short.

Succession of Varieties.

Excelsior, Michel's, Van Deman, August Luther, Cameron, Success and Early Market, were among the first ripe, but not very much ahead of the bulk of the mid-season varieties. Gandy, Nettie, Hunn, Robbie, Buster and Irene were among the last picked. There was only one or two pickings of the earliest when the mediums, viz.: Clyde, Williams, Bubach, Tennessee Prolific were ready, followed immediately by Glen Mary, Sample, Aroma, Joe, Nettie, etc.; the very late varieties were not far behind.

The experience of the past season (as also other seasons) has emphasized the great importance of a good heavy mulch, especially where the plants are thin in the row; this is to prevent the great damage that results from heavy freezing, or alternate freezing and thawing, which very often, in loam and heavier soils, is the occasion of very serious damage. Where the plants were well covered the past winter they came through fairly well; where they were without covering they suffered very much, many of the plants were killed outright. In some plantations it was said fully one-half were found quite dead in the opening of spring.

Prices ruled higher, no doubt owing to the generally light crop, as some varieties that had suffered from the extremely cold had also developed more or less rust, which prevented the plants that had come through all right

from producing a full crop. The season of fruiting was fully two weeks later than last year. The first ripe last year was picked May 30th. This year it was June 12th before I picked any. Last year's crop was a very heavy one, this year's crop was a very light one.

New Varieties.

Of the new varieties planted and fruiting for the first time a success: President, Pocomoke, Fairfield, Ben Davis, did the best. Success makes small plants, but is a good runner, makes plenty of plants, and is early. The berries are medium in size. It may prove to be a good early.

President, (Imperfect blossom): Quite promising; developed some rust; it will require a good, rich loam and clean culture; it is a strong plant, runs well; berries are large and showy, of good quality. It seems to mature all the berries that are set; there are few small ones even at the last of the fruiting season. A good strong staminate variety should be planted near it to furnish a good supply of pollen, such a variety as Woolverton, Saunders or Gandy.

Mrs. Fisher, (Imperfect): Did as well as any; this is going to prove a good one; the plant is strong and healthy and seems hardy. It was sent me by Jos. H. Black & Sons. The plant is productive; berry large to very large; handsome and fair in quality. The plant matures the full crop; no small berries. We think very well of this new variety.

Pocomoke: Did well, makes plants freely, and is healthy; berry resembles Parson's Beauty, is good color, productive, firm and fair in quality. It will prove, I think, a good market variety.

De Wet, (Imperfect): Sent me by T. C. Kevitt, N.J.; makes a large plant that stools out making few runners: the berries are large, good color but softish, good quality; mid-season; only medium in productiveness.

Fairfield: Comes among the early ones; berry a little irregular; a good plant; is well worth a trial as an early variety.

Challenge: Again failed. During the three years I have had it on trial, it has not once done even fairly well. It is reported as doing well in some places. A. W. Clark, of Providence, R.I., writes me that he won the first prize with it for "Best quart of any new variety not before exhibited." It does not suit my soil.

Cameron's Early: A great runner; plenty of foliage; it did fairly well; berry small to medium.

Commonwealth: Did not show up very well; will give it another trial.

Oom Paul: A strong plant; healthy; has a few large berries; will give it another trial.

Latest: Very late, and a good one; plant healthy, stools out, quite productive; berries a good size.

Beaver: Rusted quite badly; plant is small; hugs the ground; some fine berries in such an unfavorable season; not a fair test; will try it further.

Uncle Jim: Did fairly well; berries large and good color; somewhat soft; very much like the New York, Corsican, Armstrong, or the old Jessie.

Clyde: Did not do as well as usual, nor as well as some of the old standard varieties, but I suppose every variety will sometimes have an "off year." The Clyde is a good one.

Old Standard Sorts.

The old standard sorts such as Haverland, Bubach, Sample, Gandy, Brandywine, Saunders, Woolverton, Williams, and the fancy sorts as Marshall, Nick Ohmer, Margaret, held their average, most of them had some rust except Sample and Bubach.

Such varieties as the above and Miller, Parson's Beauty, Ridgeway, Senator Dunlap, Warfield, Wm. Belt have been so often described and are so well known that there is no need to describe them further.

Lyon, Minute Man, Greenville, Emperor, Kansas, Monitor, did well and were free from rust, also Buster, (a good one); Nick Ohmer suffered very much from the freeze up; it is a very tender variety; a very fine one when it has a favorable season.

The Sample, (Imperfect): Is a grand berry, seems to be very hardy; it is a healthy plant; berry regular, large, good color; very productive; a good one for a nearby market.

Senator Dunlap, (Perfect): A great runner; should not be allowed to grow too thick; in appearance like old Wilson in the basket; of good flavor.

The New Trial Plot.

I have quite a list of new varieties, received last spring for trial plot as follows: Cardinal, Ben Davis, Duncan, Howard's No. 2, Howard's No. 92, Perfection, Oline's Pride, Wonder, Jaggets, Early Hathaway, Louis Hubach, Oscar's Early, Sunny South, Fremont Williams, Alice Hathaway, Peerless, Nellie Hubach, Ford, Arkansas Black, Annie Hubach, Velvet, Staderman, Morning Star, Great Washington, Reliance, Floretta, Heflin's Early, Olympia. Of the above most of them have made a good growth of plants, very little or no rust as yet developed, (Oct. 31st), and look well for next year's fruiting.

The Cardinal: Plants in the new trial plot look the best, so bright and clean, vigorous; plant is strong, large and very healthy, with not a trace of rust: and if the berry turns out to be as fine as the plant, it will prove to be the "perfect" berry we have been so long looking for. The plant has not a single weakness so far as I can see. Mr. Crawford, who saw it growing in the originator's grounds in Ohio says: "It impressed us as something wonderful," it makes plants freely, long runners, setting the plants wide apart. I have quite a good lot to fruit the next season, and look forward with great hopes. Of the other new varieties, the Peerless is a strong, healthy grower

Arkansas Black: Is a very large plant branching out.

Annie Hubach: Hugs the ground, a good runner.

Alice Hathaway: Is a good, healthy runner: makes plants freely.

The Sunny South, Fremont, Williams, Ford are strong and healthy Among the best, we trust we may have a more favorable winter than last.

List for Growers and Season of Fruiting.

Extra Early and Early.

Excelsior, Success, Van Deman, Vandevere, Michel, August Luther, Cameron, Palmer, Monitor, Johnson's Early, Beder Wood, Clyde, Sampson, Lord Sheffield, Texas.

Mid-Season.

Bubach, Haverland, Lyon, Splendid, Marie, Bismarck, Tennessee Prolific, Ruby, Glen Mary, Saunders, Sample, Williams, Wm. Belt, Lovett, Senator Dunlap, Miller, Brandywine, Emperor, Nick Ohmer, Mrs. Fisher, President, Woolverton, Parson's Beauty, Minute Man.

Late to Extra Late.

Joe, Gandy, Klondike, Nettie, Robbie, Lester, Lovett, Timbrell No. 18.

G. C. Caston, (*Simcoe Station.*)

I have tested a great many varieties of strawberries here, and I am still testing new varieties. Among those now on trial are Monitor, Lester, Lovett, Fairfield, and several seedlings of my own which will fruit next year. Of those tested in the past, the greatest cropper and the most profitable has been the Crescent, but it has seen its best days unless someone will take the trouble to grade it up again by a persistent system of selection and breeding. At the present time probably the best all round berry is the Williams. Its chief fault is its uneven ripening, leaving a white tip, but when pickers get accustomed to it, this difficulty is largely overcome. It holds its size well through the season, and seems to succeed well on all soils. A strawberry for market purposes must be large. People have got educated now to look for large berries, and if they are bright and attractive in color, the flavor is not usually much taken into consideration.

Chas. Young, (*Algoma Station.*)

Strawberries are by far the best paying crop of any, either large or small fruits. Nine varieties are at present being tested. Clyde, which did best a few years ago, has to give place to Haverland. This latter has proved an excellent berry here, having a fine appearance in the box. Saunders and Williams will have to be discarded, the green tips are objectionable, and they do not yield as well as some others. As land is of little value here, I prefer planting in rows four feet apart, with plants two feet apart in the row. This gives a better chance for horse work with the cultivator and lessens the hand labor. I let all runners grow, merely keeping them somewhat straight in the row. I do not consider it profitable to take more than one crop. Our season lasts six weeks, and is about two weeks later than Toronto. We have never yet filled the local demand at 10c a box here.

During the past season I received a package of strawberry plants by express. The plants had been good and were carefully put up, but the express carried them through the "Soo," where they lay until brought here by boat. I have managed to save at least one plant of each variety. Six dozen cherry trees, Dukes, received in good order are all alive. One parcel labelled Southern Apples, according to advice note were just 15 days in getting here by express, and of no use whatever. The labels were defaced and the trees useless; they are all dead.

REPORT

OF THE

Inspector of Fumigation Appliances

1904

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

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To the Honourable WILLIAM MORTIMER CLARK, K.C.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR :

The undersigned begs to present herewith for the consideration of His Honour the Report of The Inspector of Fumigation Appliances

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

TORONTO, 1905.

REPORT

OF THE

Inspector of Fumigation Appliances

1904.

To the Honorable the Minister of Agriculture:

SIR,—I submit herewith a brief report of the work in connection with the fumigation of nursery stock during 1904. Owing to severe illness I was unable personally to conduct the spring inspection. Mr. G. R. Cottrelle, of Milton, looked after most of the nurseries, but was assisted by Mr. Fred. Broderick, of St. Catharines, who visited those in central Ontario and the vicinity of Toronto. Mr. Cottrelle was already experienced in this work, having acted as assistant to Mr. Hutt some years ago.

Dominion Government Fumigation Station at Windsor, in charge of Mr. C. Wright.

During the fall, I visited those nurseries that intended doing any shipping for fall planting or digging for early spring shipments. Outside of the large nurseries in the Niagara district that own extensive frost-proof houses, the digging of fruit stock in the fall is almost a past practice. With the larger firms mentioned, it is becoming a custom to dig extensively in the fall, and heel in the stock in trenches in large frost-proof houses. Shipments can then be sent out very much earlier in the spring, as no delay is occasioned waiting for the land to dry up. In the last few years a

number of very large substantial buildings have been erected on the grounds of E. D. Smith, Winona; Brown Bros., Brown's Nurseries; and Morris & Wellington, Fonthill, and these firms are constantly increasing the space for this purpose. Other nurseries are following their example, thus placing the business on a better footing than in past years.

The winter of 1903-4 was a very severe one for the fruit grower in Ontario. Excessive freezing and thawing, very low temperatures for long periods, and in some sections ice covering the ground everywhere, all these conditions tended to injure the roots, and following heavy crops in 1903, the trees came out in the spring of 1904 in bad condition. In those sections where the scale existed, the effect of the winter was far more noticeable on the scale infested trees. These trees were so weakened in vitality by the persistent attacks of the scale that they were unable to stand the increased strain of the severe cold. Inspector J. Fred Smith, of Glanford, observed that in some cases where trees were sprayed with lime and sulphur they came through the winter all right, whereas trees in the same orchard that were not sprayed were winter killed.

The extreme western portion of the Province suffered perhaps more than other sections. The peach orchards in the vicinity of Leamington were practically wiped out, and unless some good root protection can be brought into general use, this district will cease to grow such tender fruits. The demand for nursery stock from this at one time promising district will be very slight for years to come and until the confidence of the grower is restored. The scale had obtained a foothold there as in the Niagara district, and the peach growers were fighting it vigorously. The severe set back they have received will tend to make them careless as to the condition of the trees, and every assistance that the Department of Agriculture can afford should be given the grower.

The effect of the severe winter on the scale is thus described by Inspector J. Fred Smith, Glanford: "We had hoped that the severity of last winter would have a destructive effect upon the San Jose Scale, but the appearance of infested trees this autumn proved that there was no material difference. There was much more scale killed on peaches and plums than on apples, owing, I think, to the protection offered by the wooly bark of apple trees. Another reason for this is found in the fact that in a severe winter the vitality of peach and plum trees is at a very low ebb, and on that account they provide very little nourishment for the scale, and it is probable that the scale is starved as well as frozen."

"It was noticeable that the scale did not winter as well in the Niagara district as in some of the more exposed sections of the province, and I am unable to explain the reason for this, but it may have been caused by different conditions in the early winter. The fact that it survived such a severe winter goes to show that none of us who have scale in our orchard can afford to wait till the winter kills it."

"I am sure of the opinion that lime and sulphur is the best remedy for the scale and it will pay to use it where no scale exists as it is a very good fungicide. Spray your trees with lime sulphur and you will never have the scale. It will prove to be the 'ounce of prevention'. If you wait till your orchard is thoroughly infested you have an uphill task."

I append below the reports sent in by Messrs. Cottrelle and Broderick of their work.

F. W. Broderick: On April 19th I visited the nursery of Hunter & Sons at Scotland, Ont. I inspected the fumigation house and found it to be in good condition for the fumigation of nursery stock. They informed

me that they had just received a fresh lot of chemicals from Toronto which were in good condition. They had no tags on which the certificate was printed. I instructed them to have it placed on the back of the shipping tags.

On April 20th I went to Bright and visited the nursery of M. Milgau. Found his box in good condition. He had a quantity of chemicals put up in doses. They were in good condition. He said he had sufficient for the year. When questioned in regard to the certificate he said he was putting it on all his orders.

Dominion Government Fumigation Station at Niagara Falls, in charge of Mr. Oscar Garner.

On April 21st I visited the nursery of Mr. Caldwell at Galt, but found that he was handling no stock this year. From there I went to Kettleby and visited the nursery of M. W. Robinson. I found his fumigation house in excellent condition. He had just received a fresh supply of chemicals enough for the year. He stated that a printed certificate accompanied each order.

On April 22nd I called on Steele Briggs & Co., Toronto. I found they had a satisfactory fumigation box. They had enough chemicals for the year, and stated that they were sending certificate with orders. I also called on Colin MacDonald, and found his box in good condition. Had enough chemicals for this year, and said that he sent certificate with each order. He was handling very little stock of his own.

On April 23rd I visited the gardens of J. A. Simmers and found his box in good shape. Had enough chemicals for this year. He informed me that they were shipping very little stock of their own, but that certificates accompanied each order. I called on Granger Bros., but was informed that they were handling no nursery stock of their own.

On April 25th I called on Mr. Breckon, 256 Dundas St. As he was absent I left instructions for him to look after the fumigation. I also called on Gilchrist, Toronto Junction, and Wm. Rennie, Swansea, and found that they were shipping no nursery stock of their own growing.

G. R. Cottrelle, Milton: I visited all those in the list found in last year's report with the exception of those around Toronto, Mr. Broderick doing that district. A few men found on last year's report have dropped out and one or two new ones have been added.

Out of Business.

Angus Shaw, Virgil.
I. E. Vanduser, Winona.
W. Smith, Grimbsy.
Brock Galbraith, Bartonville.
H. L. Janzen, Berlin.
F. W. Wilson, Chatham.
N. E. Malloy, Guilds.
H. A. McIntosh, Dundela.
Campbell Bros., Simcoe.

E. Hersee, Woodstock. In flour and feed business; has a garden but grows no stock.

W. L. Clarke, Leamington: Last year, work done at Rowley's.

Alex. Glass, St. Catharines: No stock until 1906.

W. D. Kitchen, Grimsby: No stock at present for sale.

W. Lee & Son: Post office changed. McNab instead of Virgil.

All the rest of the men in the list I visited, and endeavored to carry out instructions as closely as possible.

E. D. Smith's work was done by Jas. Brown, of Fruitland.

C. W. F. Carpenter's work was done by W. E. A. Peer, Freeman.

New Men in Business.

J. E. McCombs, Ridgeville, and George Chambers, Winona.

You will notice that in every case the nurserymen are seeing that the stock sold bears a certificate of fumigation. Buyers will not accept stock unless it is certified that the same has been carefully fumigated. This is especially true of those living outside the scale infested sections. Whatever may be the sentiment towards the scale, of those fruit growers living in such infested areas, those in sections now free from the scale have rightly a dread of the pest and are determined that, if possible, it shall not be brought into their sections through the carelessness of nurserymen or others.

To show the feeling of the growers in infested areas:

The Niagara District Association at their December meeting in St. Catharines, adopted as part of their committee report the following:

"We would also recommend that the oversight and inspection of nurseries be continued, but that if the inspector finds that any nurseryman who has had the scale in his property the previous season, and has not taken the greatest pains to eradicate it, will have the facts made public in the *Canadian Horticulturist*, calling for his name and the number of trees found with the scale on and destroyed."

This method would perhaps be very severe to the nurseryman, but far better that one careless nurseryman should be driven out of business than a large number of innocent fruit grower suffer through such neglect.

From Mr. Cottrelle's report you will see that a number of smaller firms have gone out of business during the last few years. Where these have been engaged in general nursery practice, the move seems to be a wise one. Few of these firms could carry the necessary variety required to fill orders, and the temptation to substitute "just as good" varieties was

very great. This curse of the nursery trade is, I believe, dying out in Ontario. The firms remaining in the business are becoming better known and feel that they have a reputation to uphold both in quality of stock and fair dealing with their customers. All fruit growers now require fumigated stock with some assurance that it is free from scale and other insect pests. I believe that the fumigation is largely responsible for a decided improvement in all classes of fruit stock during the past four years. Owing to the danger of injury to improperly ripened wood from the cyanide gas, greater care is now exercised in properly maturing the young stock before digging in the fall and in early digging in the spring before growth starts.

By invitation of the Dominon Department of Agriculture through Dr. Fletcher, your inspector has, since his appointment, inspected regularly the Dominion Fumigation houses for Ontario situated at Niagara Falls and Windsor. Most nursery stock entering from the States into Ontario enters through these ports and is sufficiently unpacked to be properly fumigated. I enclose herewith photos of the houses at these points, showing some of the cardinal features.

As the scale is widespread throughout those States that deal largely in nursery stock, and as the pest came into Ontario through stock from Vermont, it is very important that the fumigation at these points should be thorough. As I stated last year, I have found Mr. Coleman Wright at Windsor, and Mr. Oscar Garner at Niagara Falls, very anxious to do the work as well as they can.

Mr. Wright was unable to give me the exact value of the goods that passed through his hands at Windsor, but during the past four years there have been 914 cases besides nine carloads of stock in bundles fumigated there. This would represent millions of trees, as most of the stock imported is in the form of seedlings, one carload alone last fall containing 400,000.

At Niagara Falls, I could obtain the figures only for the past year, viz.: 657 cases and eight cars in bundles, with a value of $12,724.40. As the latter station is more favorably situated for the larger nurseries, the amount of stock passing through there is considerably greater than at Windsor. The fumigation houses at these two points are practically the same size. Windsor, 16x11x8, Niagara Falls, 16x9x7. Each house is supplied with a box for fumigating small packages. That at Windsor is stationery, 7x4x2⅔, while the one at the Falls' Station is mounted on wheels, and is 6x4x2. Both houses are situated close to the tracks for convenience in loading and unloading, and both were, at my last visit in October, found to be in good condition.

Mr. Wright has devised an ingenious scheme for emptying the cyanide into the crock containing the acid and water. The accompanying engraving shows this simple mechanism which could easily be put up in any house. A string attached to the swinging box containing the cyanide passes outside and with a slight jerk after the house is closed the contents of the box are dumped into the crock. By this means there is no danger to the person superintending the fumigation.

Respectfully submitted,

P. W. HODGETTS,
Inspector of Fumigation Appliances.

A List of the Nurseries of Ontario, 1905.

Morris & Wellington, Fonthill	Fumigation houses, 2,800 cubic feet.
Pelham Nursery Co., Fonthill	Fumigation at M. & W.
B. W. Secord, Fonthill	Fumigation house, 750 cubic feet.
J. E. Crow, Ridgeville	Fumigation house, 560 cubic feet.
J. W. Page, Ridgeville	
F. Walker, Virgil	Fumigation house, 866 cubic feet.
W. Lee & Son, McNab	Fumigation house, 2,100 cubic feet.
E. Morden, Niagara Falls, South	Fumigation box, 120 cubic feet.
Smith, Reed Co., St. Catharines	Fumigation house, 1,550 cubic feet.
Titterington & Co., St. Catharines	Fumigation by Smith, Reed Co.
A. G. Hull & Son, St. Catharines	Fumigation house, 960 cubic feet.
Alex. Glass, St. Catharines	Fumigation house, 240 cubic feet.
Neil Buchanan, St. Catharines	Fumigation by J. J. Collins.
J. J. Collins, St. Catharines	Fumigation house, 460 cubic feet.
H. Cawker, St. Catharines	Fumigation house, 500 cubic feet.
Brown Bros. Co., Brown's Nurseries	Fumigation house, 6,400 cubic feet.
E. D. Smith, Winona	Fumigation house, 2,300 cubic feet and box.
C. W. F. Carpenter, Winona	Fumigation house, 1,318 cubic feet.
F. B. Henry, Winona	Fumigation by E. D. Smith.
J. E. Henry, Winona	Fumigation by E. D. Smith.
Winona Nursery Co., Winona	Fumigation by E. D. Smith.
Webster Floral Co., Hamilton	Fumigation house, 240 cubic feet.
Ward Bros., Bartonville	Fumigation house, 642 cubic feet.
Brock Galbraith, Bartonville	Fumigation house, 320 cubic feet.
Fruitland Nursery Co., Fruitland	Fumigation box, 1,620 and 70 cubic feet.
M. Milgan, Bright	Fumigation house, 1,377 cubic feet.
A. W. Graham, St. Thomas	Fumigation box, 62 cubic feet.
H. L. McConnell, Lakeview	Fumigation house, 400 cubic feet.
C. A. Baker, London	Fumigation house, 510 cubic feet.
D. Dempsey, Stratford	Fumigation house, 100 cubic feet.
J. McAinsh, Wellburn	Fumigation house, 145 cubic feet, box 52½ cubic feet.
Strathroy Nursery Co., Strathroy	Fumigation house, 72 cubic feet.
Estate of J. Stewart, Goderich	Fumigation house 300 cubic feet.
J. W. Skinner, Mitchell	Evergreens. —
Chas. Ellis, Meaford	Fumigation house, 475 cubic feet.
J. H. Wismer, Port Elgin	Fumigation house, 900 cubic feet, box 45 cubic feet.
W. Fleming, Owen Sound	Fumigation house, 250 cubic feet.
S. H. Newman, Owen Sound	Fumigation house, 500 cubic feet.
T. C. Robinson, Owen Sound	Using S. H. Newman's house.
W. M. Robinson, Kettleby	Fumigation house, 300 cubic feet.
Steele, Briggs Seed Co., Toronto	Fumigation box, 75 cubic feet.
J. A. Simmers, Toronto	
Manton Bros., Eglinton	
Granger Bros., Deer Park, Toronto	
Stanley Spillett, Nantyr	
R. Breckon, 256 Dundas St., Toronto	
Colin McDonald, Toronto, 1,161 Queen St. East	Fumigation house, 305 cubic feet.
Thos. Rowley, Leamington	Fumigation house, 875 cubic feet.
S. Ward Kennedy, Leamington	Fumigation house, 600 cubic feet.
Geo. Cady, Ruthven	Fumigation house, 860 cubic feet.
McKenzie Boss' Sons, Chatham	Fumigation house, 915 cubic feet.
N. T. Selby, Newcastle	Fumigation house, 560 cubic feet.
L. K. Shourds, Wellington	Fumigation house, 1,000 cubic feet.
Wallace Woodrow, Picton	Fumigation house, 500 cubic feet.
W. C. Reid, Belleville	Fumigation house, 190 cubic feet.
J. W. Johnston, Campbellford	Fumigation house.
Thos. Dangerfield, Kemptville	Fumigation house, 640 cubic feet.

W. G. Conn, Kemptville ..... Fumigation house, 640 cubic feet.
Renfrew Nursery Co., Renfrew ..... Fumigation box, 96 cubic feet.
David Tait, Iron Bridge, Algoma
Hunter & Son, Hawthorne Nurseries, Scotland ....
Chas. Fisher & Son, Fenwick.
G. E. McCombs, Ridgeville.
George Chambers, Winona.

Model device for dumping cyanide into acid from exterior of house. Planned and in use by Mr. Wright at Windsor.

THIRTY-FIFTH ANNUAL REPORT

OF THE

Entomological Society

OF

ONTARIO

1904

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1905

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TORONTO

To the Honourable William Mortimer Clark, K.C.,

Lieutenant-Governor of the Province of Ontario.

May it please your Honour:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Entomological Society of Ontario for 1904.

Respectfully submitted,

NELSON MONTEITH
Minister of Agriculture.

Toronto, 1905.

CONTENTS.

	PAGE
Letter of Transmission	1
Officers for 1904-1905	2
Annual Meeting of the Entomological Society of Ontario	3
Report on Insects of the Year—Division No. 1: C. H. Young	3
" " " Division No. 2: C. E. Grant	4
" " " Division No. 3: J. B. Williams	5
" " " Division No. 4: G. E. Fisher	7
" " " Division No. 5: R. W. Rennie	9
Report of the Council	12
" " Montreal Branch	13
" " Quebec Branch	16
" " Toronto Branch	19
" " Botanical Section	21
" " Microscopical Section	21
" " Librarian and Curator	21
" " Treasurer and Auditors	22
" " Delegate to the Royal Society	23
Insects and Weeds in the North-West Territories: T. N. Willing	25
Injurious Insects of the Season of 1904: W. Lochhead	27
Recent Experiments against the San Jose Scale: W. Lochhead	33
Annual Address of the President—Recent Progress in Entomology: W. Lochhead	35
Insect Distribution in the Great Basin: H. F. Wickham	42
Second Day's Session	46
Insects injurious to Ontario's Crops in 1904: James Fletcher	49
Entomological Record, 1904: James Fletcher	56
Further Notes on Basswood or Linden Trees: Arthur Gibson	78
Note on the Columbine Borer: Arthur Gibson	81
Insects collected at Light during 1904: J. D. Evans	82
Spinning Methods of Telea polyphemus: J. W. Cockle	86
Insect Names and Insect Lists: J. B. Williams	87
Notes on the Season of 1904 in Quebec: C. Stevenson	90
Insects affecting the Oak: T. W. Fyles	91
On the Food-habits of certain Hymenoptera: T. W. Fyles	94
An Elementary Study of Insects: W. Lochhead	96
The Pear-tree Psylla, and how to deal with it: G. E. Fisher	108
Obituary: The late John Alston Moffat	111

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WILLIAM LOCHHEAD, B.A., M.SC.

PROFESSOR OF BIOLOGY AND GEOLOGY, ONTARIO AGRICULTURAL COLLEGE, GUELPH
PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, 1902-4.

THE LATE JOHN ALSTON MOFFAT.

LIBRARIAN AND CURATOR, ENTOMOLOGICAL SOCIETY OF ONTARIO, 1890-1904.

THIRTY-FIFTH ANNUAL REPORT

OF THE

Entomological Society of Ontario

1904.

To the Honourable the Minister of Agriculture:

SIR,—I have the honour to present herewith the Thirty-fifth Annual Report of the Entomological Society of Ontario, which contains the proceedings of the Forty-first Annual Meeting, held at London on the 26th and 27th of October, 1904. The report includes the papers read and the reports submitted by the various Officers, Sections and Branches of the Society.

The Canadian Entomologist, the monthly organ of the society, has been regularly issued during the past year and has now completed its thirty-sixth volume, which has fully maintained the high scientific standard of its long series of predecessors.

I have the honour to be, Sir,

Your obedient servant,

CHARLES J. S. BETHUNE,
Editor.

London, Ontario.

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THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

ANNUAL MEETING.

The Forty-first Annual Meeting of the Entomological Society of Ontario, was held in London, on Wednesday and Thursday, October 26 and 27, 1904. The chair was taken by Professor Wm. Lochhead, of the Ontario Agricultural College, Guelph, President. Among the members present were Dr. James Fletcher and Mr. Arthur Gibson, Central Experimental Farm, Ottawa; Mr. H. H. Lyman, Montreal; Mr. C. H. Young, Hurdman's Bridge; Mr. J. D. Evans, Trenton; Mr. J. B. Williams, Toronto; Mr. G. E. Fisher, Burlington; Rev. Dr. Bethune, Dr. Woolverton, Profs. Dearness and Bowman, Principal Merchant, Messrs. Balkwill, Bock, Law, McCready, Saunders, Thompson, Westland and others, London; Miss Dunlop, Woodstock. The Society was also favored with the presence of Prof. H. F. Wickham, of the University of Iowa, Honorary Member of the Society; Mr. T. N. Willing, Government Inspector of Weeds and Insects in the Northwest Territories, Regina; and Prof. Creelman, President of the Ontario Agricultural College.

During the morning of Wednesday, Oct. 26th, a meeting of the Council was held. The Treasurer's report was discussed and gratification was expressed at the improvement in the Society's financial position as a result of the economies put in practice last year. Various matters of business were brought forward and discussed, and after the preparation of its annual report the Council adjourned.

In the afternoon the Society met at 2.30 o'clock. Prof. Lochhead, the President, on taking the chair, congratulated the Society on the large and comfortable room in the London Public Library building, in which they were assembled, and into which their library and collections had recently been removed. The improved quarters and greater accessibility would, he felt sure, increase very much the popularity of the Society and add to its usefulness. He then paid a tribute to the memory of the late Mr. John Alston Moffat, the curator and librarian for many years, who died at the end of February last. "We all," he said, "missed his kindly face and gentle courtesy. He did much good work for the Society and in entomology, but at the ripe age of nearly eighty years, we could not have expected a longer maintenance of the industry and activity that characterized his earlier days." The Society was fortunate in having Dr. Bethune to fill the vacant place. The reports of the Directors on the insects of the season in their respective Divisions were then called for by the Chairman.

REPORTS ON INSECTS OF THE YEAR.

Division No. 1—Ottawa District. By C. H. Young, Hurdman's Bridge.

I am glad to be able to report that there have been no serious outbreaks of any injurious insects during the season of 1904, in the Ottawa district. The whole season has been a remarkable one for the absence of insects of all kinds. In the eight years, during which I have resided near Ottawa and collected insects, I have never in any season seen so few. This no doubt was due in a large measure to the unfavorable weather which prevailed, the nights par-

ticularly being cold and disappointing. The only time during which any success at all was to be obtained from collecting was from about the middle of May till about the middle of June.

Of injurious insects, the most serious outbreak was that of two kinds of cutworms, viz., the Red-back Cut Worm (*Paragrotis ochrogaster*) and the Dark-sided Cutworm (*Paragrotis messoria*). The former of these was the most abundant, and did considerable damage. Those who tried the poison bran-mash had remarkable success. This is a splendid remedy, being made by simply moistening some bran with sweetened water and adding Paris green in the proportion of half a pound of Paris green to 50 lbs. of bran. The mixture may then be scattered among the plants to be protected, and strange to say the cutworms will feed upon it in preference to the growing plants.

The Colorado Potato Beetle was very plentiful, but was easily kept under control where the plants had been sprayed with Paris green and water. Root Maggots were destructive throughout the district. The Onion Maggot did the most harm and some of my neighbors lost all their plants before the pest was detected. It is to be regretted that there is no good practical remedy for these troublesome insects. For the Onion Maggot mixtures containing some form of carbolic acid have given good results in the hands of some. These have to be applied just as soon as the young plants appear above the ground, and further treatments made at intervals of a week or ten days. The Turnip Aphis was rather prevalent in some fields, but I do not think it did much damage, as it was accompanied by numerous parasites.

The Eye-spotted Bud-Moth was abundant in one orchard, being observed particularly on a crab apple tree.

The nests of the Fall Web-worm have been rather noticeable, particularly on shade trees. There is no reason why these unsightly nests should be allowed to remain on the trees. If the twigs bearing the nests are cut from the trees and burned, all the caterpillars which are inside these tents will be destroyed.

In my last report I omitted to mention a slight infestation of a small bristly caterpillar, which I found at Meeck's Lake, Que., attacking cabbages. Dr. Fletcher has just told me of a similar, but more important outbreak of the same species (*Evergestis straminalis*) in the Maritime Provinces. An account of this latter and notes on this new pest of cabbages and turnips will be found in the Report of the Entomologist and Botanist to the Dominion Experimental Farms for 1904. This insect, which has been given the name of the Purple-banded Cabbage Worm, did not do very serious damage to the cabbage plants at Meeck's Lake in 1903, only two or three specimens being noticed on each plant.

During the year I have continued to collect the lepidoptera of the Ottawa districts, but outside of a collection of over 700 specimens of microlepidoptera which I made, I did not take very many interesting butterflies or moths. Over fifty specimens of my collection of micros have been very kindly named for me by Mr. W. D. Kearfott, of Montclair, N.J., who I am pleased to state found some very interesting species, and one or two which may be undescribed.

Division No. 2—Midland District. By C. E. Grant, Orillia.

Very few insect pests have come under my observation or have been reported to me this year—in fact like the previous two years most insects were very scarce. Whether the cold weather last winter or the cool summer are responsible for the scarcity I do not know, but when you have to *hunt* for a

specimen of *A. plexippus*, *C. philodice* or *P. rapæ* and other common butterflies there must be indeed some great drawback to their propagation. I made some very good catches, however, of insects not before taken here but unfortunately I have not had time to work out their identification. The following noxious insects were reported to me or observed.

Phorbia ceparum, the Onion Maggot—this insect was again reported as very destructive. I recommend carbolic acid to be applied according to Dr. Fletcher's formula.

Anthrenus scrophulariæ—the Buffalo beetle—I had numerous complaints from the ladies of Orillia of the havoc caused by these beetles. They seemed to be extremely common this year but I could not suggest a remedy.

Pulvinaria innumerabilis—the Cottony Maple Scale—this insect was very plentiful on the maple trees of Orillia and must have caused some damage to the trees but will likely not appear next year as it is about six years since I noticed it as plentiful before.

Doryphora decemlineata (Potato beetle) and *Carpocapsa pomonella*—the Codling moth—were about as plentiful as usual though the apples were not nearly as good a crop as last year.

Haltica chalybea (the Grape-vine Flea-beetle). This insect was very numerous and attracted the attention of most vine growers in the vicinity.

Cut Worms and the grubs of June beetles (*Lachnosterna fusca*) were very plentiful.

Malocoscoma Americana and *disstria*—(Tent caterpillars)—were quite scarce and have been now for three years.

Nematus ribesii. It is a remarkable fact that this currant worm appears to have left us. During the last two years currant bushes left without protection from hellebore or Paris green have not had a leaf eaten, whereas in former years they would not have had a leaf remaining.

Crioceris asparagi and 12-*punctata*. I have kept a sharp lookout for these beetles amongst the neighboring asparagus beds, but the destroyers have evidently not reached this northern country as yet.

Division No. 3—Toronto District. By J. B. Williams.

As an inhabitant of a large city, I have not many opportunities of hearing about the pests that are troubling the farmers and fruit-growers; and cannot, therefore, say very much about them.

In Toronto itself the Tussock Moth (*Hemerocampa leucostigma*) has done a great deal of damage this year to the shade trees of the city. Mr. Chambers, the Park Commissioner, tells me that they were about fifty per cent. more numerous than last year, and they most affect parts of the city where chestnut trees are abundant. He has tried, this year, a plan of encircling the trees with a ring of sheet-brass, frayed out on the lower edge. This has been fairly successful in preventing caterpillars from ascending the trees. As soon as the leaves have fallen he intends to have the egg-masses collected from the trees in the streets and public parks and burned, as the City Council made a grant this year for that purpose; but in order that the pest may be got under control it is most necessary for private owners to co-operate in this work, and clear the egg-masses off their own trees; otherwise it is almost waste of time to clear adjoining shade trees, for they are soon occupied again by caterpillars from private grounds and gardens.

There has been a remarkable abundance of Walking-stick insects (*Diapheromera femorata*) Fig. 1, in Niagara Glen this year; they have also been more plentiful than usual around Toronto. Some of us were at the Glen on the 18th of August, and took a few specimens, nearly all of which were males, but did not notice, then, anything remarkable in their number. Dr. Brodie was over again on September 18, with some friends, and reported them as very numerous; many specimens having fallen on them from the trees, as they walked through the woods; so I went over on September 23 to get a few more specimens. I could have got hundreds, if I had wanted them. They are not generally very plentiful around Toronto; one may sometimes get about a dozen in an afternoon by specially looking for them; but often one may not see that number in a whole season.

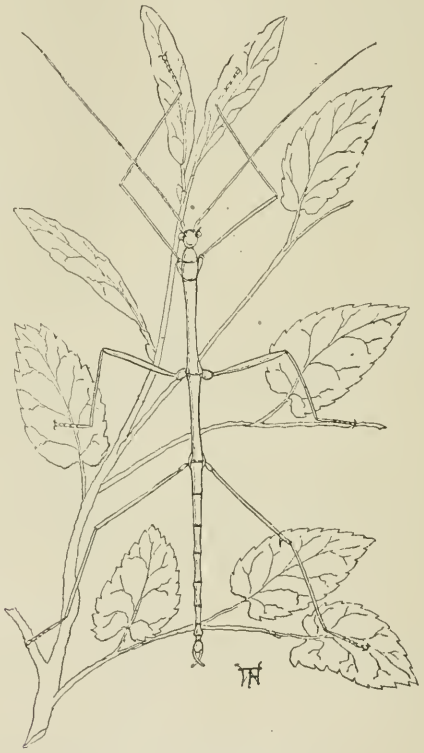


Fig. 1. Walking-stick insect.

I have read accounts of their being very numerous in parts of Pennsylvania; but I never expected to see such hosts of them in Canada as I did on the afternoon of September 23. In a part of the north end of the Glen, where they were most numerous, many of the bushes were quite stript of their foliage, only the thick veins of the leaves being left, and some large trees also were quite bare.

On one tree, whose top still retained a little foliage, there was a line of them almost covering one side of the trunk and reaching from the ground as far as the eye could see. Some were constantly running across the paths so that it was difficult to avoid treading upon them; and a continual dropping could be heard as they fell from the trees and bushes. I took some large ones, that were at least half an inch longer than the average Toronto

specimens. These were on the outskirts of the crowded parts, as the supply of food was more plentiful than in the congested district, where it seemed to be almost exhausted, and the specimens were small. (Specimens from Niagara and Toronto were exhibited, showing the different sizes.)

I was near Jackson's Point on Lake Simcoe the beginning of September, and found the Potato-beetles rather numerous. They suddenly increased about the 5th of September, and were very plentiful along the roads for a day or two. I heard that some potato crops had suffered a good deal from them.

Butterflies have not been generally plentiful this year. The Monarch (*Anosia plexippus*) is the only one that I have seen a really good number of at one time. On August the 24th, they were very thick at the north end of High Park. You could hardly stand anywhere in an area of several acres without seeing seven or eight of them almost within striking distance. The first of this species seen during the present year was on May 10th, and the last on October 18th, both on Yonge street, in the centre of the city. Where had the first come from, and where was the last going to?

I heard from a friend, living just north of Toronto, that ants had been very troublesome in his garden this summer, and he thought they injured his potato plants; but I did not have an opportunity to secure any specimens, and so do not know what kind of ants these were.

In the discussion that followed the reading of this report, Dr. Fletcher, Mr. Balkwill, Dr. Bethune and Mr. Fisher, all stated that they had never seen any injury done to foliage by ants. The damage was probably done by some species of aphis, and the ants were attracted by them to the plants.

Division No. 4—Hamilton District. By George E. Fisher, Burlington.

In submitting my report of insect conditions during the past year, permit me to explain that the business in which I am engaged is so exacting of my time there was little opportunity for investigation, which is to be regretted, as the advantage to growers of directing the attention of this important meeting to conditions that really exist cannot be overestimated.

The Entomological Society's year just closing was not in my district suitable for insect advancement. The sudden plunge from almost tropical to Arctic weather which occurred in October last, unexpected even by the insects, was a terrible shock and put most of them out of business. This followed by a winter of unprecedented frigidity and a cold wet summer that came late, cut them off in large proportion and seriously hampered development. Unfortunately this abnormal weather which so seriously inconvenienced insects was equally trying to fruit crops, trees and plants. Apples and plums were not plentiful in some sections and where this occurred there seemed to be a curculio or codling worm for every specimen that formed. A great many plum trees had died. Peach trees have fared better. There will be a rattling among the dry plum trees when spring comes; and as the supply of plums has been greatly in excess of the demand of late many dead and dying orchards will not be replaced. The roots of fruit trees are more tender than the tops and I would emphasize the importance of a cover crop for root protection in Winter. Orchards may be cultivated with much advantage down to July 15th; but after that date it is equally advantageous to give the weeds full possession or in the absence of weeds to sow something.

Some of the insects that have occasioned trouble from time to time in this section were hardly to be found, particularly Canker Worm, Pear Psylla, Cherry Maggot, Stink Bug and Pea Weevil, while others unusually bad were

the Potato Bettle, Asparagus Beetle, Plum Lecanium, Curculio, Codling Moth and San Jose Scale.

There are some fine examples of successfully combatting Plum Lecanium and Oyster Shell Bark-louse with lime and sulphur. In several instances no live insects have been observed since the treatment was given in the spring.

For some reason the Pea-Beetle did not appear and farmers count on growing peas more extensively next year. For a long time it has been my contention, that a severe winter will destroy the Pea-Beetle and our present experience seems to bear out this idea.

The San Jose Scale was on deck as usual when summer came; not however without suffering a heavier loss than from any previous winter in Canada. Owing to the cold spring the larvæ did not apear till July, about two weeks after the usual time, and the multiplication during the season was not nearly so great as in ordinary years, but was sufficient to greatly increase the degree of infestation beycnd what it was a year ago. The area of infested sections is increasing, as the scale (besides increasing the density) reaches out continually and extends the limit. Several new infested points were discovered. One new outbreak not very far from home I have had under observation during the summer. Where the scale was plentiful and the vigour of the trees reduced, the effect of the winter was very marked. Many such orchards have already died and others cannot long survive. The peach orchards are so reduced by scale and frost that there will be no glutted markets until other orchards are produced.

Realizing this, the more intelligent growers treated their orchards last spring. A greatly increased quantity of spraying material was used which was again supplied by the Government at half cost as follows:—8,631 gallons of crude petroleum, 772 112 lb. sacks of sulphur and 40 bbls. of McBain's crude carbolic acid mixture which cost $17.50 per barrel. This latter was used regardless of the price (which is prohibitive) with results somewhat better than last year, but not very satisfactory. The crude petroleum was used mostly in the township of Niagara and my information is that its use will not be continued as most of the growers now recognize the superiority of lime and sulphur which has come to the front very much during this season. In my judgment there is no spray remedy for scale equal to it and its effect as a fungicide is such that fungus did not appear in considerable quantity where it was used on trees, bushes or vines; and on orchards which had been treated regularly there was apparently no fungus at all. In the spring of 1902 an orchard comprising 160 apple, pear, plum, peach and cherry trees somewhat infested with scale was sprayed with 20 bbls. of a heavy mixture of lime and sulphur thoroughly cooked. The trees were whitened in every part and attracted much attention. Although there has been no subsequent treatment there is aparently no live scale remaining and this is not the only instance of perfect work in killing the scale with a single operation.

Letters from New Jersey complain of the inefficiency of lime and sulphur and speak of returning to crude petroleum. These letters also explain their methods of preparation and what better results need they expect? In many cases they depended upon the slaking lime to reduce the sulphur, using both in small proportion and making a weak mixture. When they cooked it, the boiling was continued only from thirty minutes to an hour which is insufficient. For best results (and these alone are satisfactory) the wash should contain ½ lb. of sulphur to the gallon and enough of lime to thoroughly reduce it, say ½ lb. to 1 lb. of lime to the gallon and the cooking be continued two full hours. At the end of the first hour it will be changing color. In a little longer time the color will be a good amber and tinged with

red. A little later this amber will have become much darker and have a green shade. When this condition is reached the pumps do not clog; the work of applying it is not so objectionable and if the trees be well covered a good result is guaranteed.

As far as we have gone I have discussed this question entirely from the standpoint of a fruit-grower which in your judgment may seem out of place at this meeting. This is the only means I now have of reaching the people and my desire to encourage and assist them must be my apology.

Division No. 5—London District. By R. W. Rennie.

No case of serious injury by insects has been reported to me this season. Of course, we have had all our old enemies with us, but not in larger numbers than usual, excepting probably the Tent caterpillars (*Clisiocampa Americana*) which appeared in large numbers early in the season, but which seemed to confine themselves mostly to the wild cherry, orchards being comparatively free from them.

One pest, which is ordinarily called "Red Spider," and is quite common in gardens of sandy soil, which also is not very particular as to its food plants, has selected a new one this year, at least it is the first time I have observed them on this plant, namely, the tomato.

About the first of August I noticed one of my tomato plants looking unhealthy, and upon investigation found it had been attacked by these mites: some days afterwards, while walking in the country, I noticed some tomato plants which appeared to be suffering from the same cause, and upon examination such proved to be the case. Several other places were also noticed during the season.

In my own garden the plants attacked did not set any fruit above the second cluster of buds, the leaves curled in tightly, very much like the leaves of the shrub-snowball, when attacked by Aphis, making it almost impossible to apply any remedy.

If the pest should take generally to the tomato, it will mean serious loss to private and market gardeners, as it will be very difficult to apply any remedy in the fields owing to the leaves curling so tightly and the mites being on the inside.

DISCUSSION OF THE DIRECTORS' REPORTS.

In the discussion which followed upon the reading of the Directors' reports, the first subject taken up was that of the remedies employed for the San Jose Scale.

Dr. Fletcher stated that he had used the lime and sulphur wash after slaking only, without boiling, on Snowballs (*Viburnum*) for Aphis with good results, but had not tried it for the San Jose Scale.

Mr. Fisher said that one great cause of failure with this wash was that the boiling was not continued long enough; the mixture was not fit to use till the green shade appeared. This he had learnt as the result of repeated experiments. In California the boiling process was continued for three hours, but he had obtained the same results in two hours. The most effective mixture was made with the proportions of half a pound of sulphur to one pound

of lime; he intended, however, to use a mixture of equal weights of each. He did not consider it necessary that the wash should remain for any length of time on the trees as he found that the insects were killed by it immediately.

Prof. Lochhead thought that the continuance of the wash on the trees was important as a protection against fungous diseases, even if not necessary for the destruction of the scale. He was of opinion that making the mixture by slaking instead of boiling might do for the Aphis, but was not effective for the scale.

Dr. Fletcher was anxious that the question should be thoroughly tested, as, if slaking will do, a hundred people will make the wash by this easier process to one who will take the trouble to boil it for two hours.

Mr. Fisher then referred to the Pear-tree Psylla. In February his man used lime slaked and applied without any sulphur; he put it on thick, as much as he could get to stick. The result was that the trees were perfectly cleared of the insect and of fungus, though the orchard had been condemned.

Mr. Macoun and he had experimented on a small orchard near Niagara which they treated with plain white-wash. Some trees they covered once, some twice and some three times. In the spring more scale was found under the white-wash than on the untreated trees! It seemed that the insect was actually protected against the severity of the winter by the white-wash.

This year at Burlington the Psylla was absent, though they had always had it for many years previously. No less than 400 dwarf Duchess pear trees were killed by it only a few years ago. At that time, unfortunately, he did not know that it could be controlled by kerosene emulsion, or the lime and sulphur wash. The latter should be applied between the middle of March and the middle of April. If applied in December the lime and sulphur wash injures the tree because the wood is not sufficiently matured and late in the spring it injures the buds.

Mr. Balkwill stated, in reference to the Pea-weevil, that it was very bad this year in some places about London, while some farms were quite free from it.

Mr. Evans said that it had entirely disappeared about Trenton; he thought that the exceptionally cold winter had killed the beetle.

Dr. Fletcher urged that now is the time to fight this insect while its numbers were reduced and it was comparatively weak; everyone should fumigate his peas and make a complete destruction of the weevil.

Mr. Fisher, in reply to an enquiry, said that the New York Plum Scale had increased from neglect in many places; the severe winter had not affected it. The Oyster-shell Bark-louse was entirely killed by the lime and sulphur wash. Lime used alone has only a mechanical effect by causing the insect to fall off with it, but does not itself kill the louse.

He wanted to know whether there was any practicable remedy for Wire-worms. Acres of melons had been destroyed by them in his district.

Dr. Fletcher advised double plowing—in early August and in September; Mr. Fisher replied that this would not be practicable in the case of tomatoes, but both Dr. Fletcher and Prof. Lochhead said that Wire-worms did not attack tomatoes, but were often very destructive in wheat fields and to other crops. In the case of melons Dr. Fletcher advised trapping the parent-beetles by means of poisoned potatoes; these should be raw, sliced and dipped in Paris green and water, and then scattered about the infested places. This would be of use as a protection for the future, but there was no known remedy that was practicable for the Wire-worms themselves nor for white grubs, the larvæ of June beetles, which are also root-feeders.

Mr. Fisher said that it had been recommended to plough rye under where melons were to be planted on the supposition that the Wire-worm would find enough food in the rye and would leave the roots of the melons alone.

Dr. Fletcher replied that the theory was incorrect, as rye was distasteful to these worms and kept them away. If wheat or oats were ploughed under instead they would be attracted. A cause of the trouble in the case of melons was that the large quantity of manure employed served as a great attraction to the Wire-worms. The reason for the ploughing that he recommended was that the insect became mature in the second autumn after the eggs were laid; ploughing in August destroys them in the pupa state, and the repetition in September disturbs the beetles in the ground and by bringing them to the surface ensures the death of a large proportion.

Mr. Evans said that he had known acres of tomatoes to be destroyed by Wire-worms.

Mr. Fisher stated that he had observed the same thing. He had also found that if tomatoes were sown early and well-grown in hot-beds before planting out, they were then large, over-grown and tender; if the weather should be unfavorable, the lower leaves became blighted. Much the same thing happened with potatoes which had grown rapidly. This year in his neighborhood the Colorado beetle had in many cases left the potato plants and attacked the tomatoes, causing much destruction; it had also been very bad on egg-plant.

Dr. Fletcher said that the Colorado beetle was worst of all on egg-plant, very bad on potatoes and least injurious to tomatoes.

Fig. 2. Squash Bug.

Mr. Fisher next referred to the Squash-bug (Fig. 2), commonly called the "Stink-bug" and sometimes "the Bishop-bug" (*Anasa tristis*). Though it had been abundant and very injurious for a long time, this year he had seen none. Last year it took three days to get 20 tons of pumpkins for his canning factory; this year 30 tons were procured in two hours—thanks largely to the absence of this bug. As a general rule it was difficult to grow pumpkins, owing to the destruction of the foliage by the Squash-bug. The striped Cucumber beetle was, however, as abundant and injurious as ever; he had been informed that it might be got rid of by watering with a solution of one pound of saltpetre in ten gallons of water.

Dr. Fletcher stated that in all his experience he had never known insects of all sorts so scarce as they were this year, and this was the case from the Atlantic to the Pacific. Other members from different parts of the country corroborated the statement.

REPORT OF THE COUNCIL.

The Council of the Entomological Society of Ontario begs to present its Annual Report for the year 1903-1904.

The fortieth Annual Meeting of the Entomological Society of Ontario was held in Ottawa, on the 3rd, 4th and 5th of September, 1903. The day meetings were held in the commodious and comfortable rooms of the Ottawa Board of Trade which were kindly put at the disposal of the Society and for the evening meetings the large Assembly Hall of the Normal School was secured.

The meetings throughout were fairly well attended both by members of the Society and by citizens of Ottawa. Several members of the Montreal and Toronto Branches were present and added greatly to the interest of the meetings.

The reports of the various Directors of Divisions showed that good work had been done in different parts of the Province in observing injurious insects and distributing information concerning remedial treatment. Most of these reports were illustrated by specimens. The full report of the proceedings and the discussions at the sessions has already been published and distributed to the members of the Society. This was the Thirty-fourth Annual Report on practical and general entomology and was presented to the Honorable the Minister of Agriculture for Ontario in December last and was printed and distributed in March.

It contains 116 pages and is illustrated with 59 wood cuts and 5 plates; one of the Rev. G. W. Taylor, an active member of the Society for many years who has done excellent work in fostering the study of practical and systematic entomology in British Columbia and was at one time the honorary Provincial Entomologist. Four plates show the results of remedial treatment for the San Jose Scale carried on under Prof. Lochhead, the President. Besides the account of the annual meeting, the reports of Divisions and Branches, the sections and officers at London, and the President's Annual Address on "The Progress of Economic Entomology in Ontario," the volume contains papers on the injurious insects of the year by Prof. Lochhead, Dr. Fletcher, Messrs. C. Stevenson, A. H. Kilman and T. D. Jarvis; "The present condition of the San Jose Scale in Ontario," and "A key to the insects affecting the small fruits," by Prof. Lochhead; "The Entomological Record for 1903," a most useful and important contribution by Dr. Fletcher; "A menace to the Shade-Trees of London," and "The Great Leopard Moth," by Dr. Bethune; "A card system for notes on Insects," by A. F. Winn; "The Syrphidæ of the Province of Quebec," by G. Chagnon; "An interesting enemy of the Iris," and "Basswood, or Linden, Insects," by A. Gibson; "The food-habits of Hymenopterous Insects," by Dr. Fyles; "Collecting at Light in Manitoba," by A. J. Dennis; "Fly-tormentors in New Ontario," by T. D. Jarvis; "Hunting for Fossil Insects," by Dr. S. H. Scudder; "Recollections of the past," by the late J. A. Moffat. There were also full reports of Dr. L. O. Howard's addresses on "The Transmission of Yellow Fever by Mosquitoes," and the work being carried on by the Washington Division of Entomology against the Cotton Boll Weevil. The volume closes with a biographical sketch of the Rev. G. W. Taylor and an obituary notice of the late Prof. A. R. Grote, one of the honorary members of the Society.

The Society regrets very much that the distribution of this Annual Report was so greatly curtailed owing to the destruction in the great Toronto fire of April 19th, of no less than 5,000 copies, together with all the plates and engravings used in its illustration. These copies were to have been bound

up with the report of the Ontario Fruit-Growers' Association and given to its members and to those of the Provincial Horticultural Societies.

The Canadian Entomologist has been regularly issued at the beginning of each month. The 35th volume was completed last December, and contains 352 pages illustrated with six full-page plates and fifteen original figures in the text. The contributors number sixty-one, a larger number than usual, and represent Canada, the United States, Great Britain, Germany, Luxemburg and Cuba.

During the greater part of the year meetings for the study of Entomology have been held on Saturday evenings, alternately with those of the Botanical and Microscopical Sections. Several very interesting and enjoyable excursions were made to places in the neighborhood of London by the entomologists and botanists and their friends. The Council regrets very much that owing to the removal of several of its most active members the Ornithological Section has not held any meetings during the past year, and the Geological Section has not been revived, though Dr. Woolverton continues to give lectures on Geology to the students of the Western University.

It is a matter of much gratification that the Council have been able to lease the large and convenient room in the Public Library on Queen's Avenue, in which the annual meeting is now being held. The room in the Y. M. C. A. building occupied by the Society for the last eight years, was very inconveniently situated and had become too small for the steadily increasing library and collections. The removal was carefully and safely effected under the direction of Messrs. Bethune and Balkwill, and to them the thanks of the members are due for the labour they bestowed upon it and the excellent order in which the property of the Society is now to be found.

The Council desire to place on record their profound regret at the loss they have sustained through the death of Mr. John Alston Moffat, which took place on the 26th of February last after a prolonged illness. For fourteen years Mr. Moffat discharged the duties of Librarian and Curator of the Society with the greatest devotion and care. He was always ready to do everything in his power to further the objects of the society and to assist the members in their investigations and studies. His kindness and unfailing courtesy endeared him to all who had the pleasure of his acquaintance. He contributed many valuable papers to our magazine "*The Canadian Entomologist*," and to our annual reports to the Legislature of Ontario; his scientific attainments thus became widely known and his work in some sections of the Lepidoptera was much appreciated.

All which is respectfully submitted.

WM. LOCHHEAD,
President.

REPORT OF THE MONTREAL BRANCH.

Minutes of the 258th regular and 31st Annual Meeting held on the 9th of May, 1904, at the Natural History Rooms, University Street, Montreal.

Minutes of the last regular meeting were read and confirmed, and the minutes of the previous annual meeting taken as read, and confirmed.

The following members were present:—

Messrs. Charles Stevenson, A. F. Winn, A. E. Norris, L. Gibb, A. Griffin, G. R. Southee, Geo. A. Moore, and Master K. R. Stevenson and Alfred Holden, visitors.

The President reported that Mr. Gibb's case had been filled and sent to St. John's School.

The Librarian reported that the new unit to bookcase had been ordered but had not yet been received.

The President, Mr. Charles Stevenson, read the following report on behalf of the Council:—

The Thirty-first Annual Report of the Council of the Montreal Branch of the Entomological Society of Ontario.

Your Council have pleasure in presenting the following report for the Session 1903-1904.

Nine regular meetings were held with an average attendance of eight, at one of which we had the pleasure of the attendance of Dr. James Fletcher.

The following papers were read, the greatest number since the foundation of the Branch.

1. Annual Address of the President..... Charles Stevenson.
2. Method of coloring photographic lantern slides of Butterflies. (Illustrated)..... A. E. Norris.
3. The Lepidoptera of Kirby's insects of the Fauna Boreali-Americana..... H. H. Lyman.
4. Report on the Annual Meeting of the Entomological Society of Ontario, 1903 ..... Charles Stevenson.
5. Notes on the Season, 1903. Western Quebec ..... Charles Stevenson.
6. Notes on the Season, 1903 ..... Geo. A. Moore.
7. Ten minutes collecting late in October..... Charles Stevenson.
8. A late capture of a Cerambycid ..... Charles Stevenson.
9. To preserve the natural colors of Dragonflies ..... Charles Stevenson.
10. My first attempt to rear Caterpillars ..... Edward Denny.
11. Notes on Cerambycidæ with special reference to the Prionidæ..... G. Chagnon.
12. Notes on Ennomos magnarius, Guenee ..... A. F. Winn.
13. On occurrence of larvæ of Feniseca Tarquinius in November ..... A. F. Winn.
14. Miscellaneous Entomological Notes ..... H. H. Lyman.
15. Collecting Notes for 1903 ..... H. H. Lyman.
16. Notes on Hepialus mustelinus, Pack ..... A. F. Winn.
17. Collecting at light during the Season of 1903 ..... A. E. Norris.
18. Phymatidæ ..... Geo. A. Moore.
19. Montreal Gortynas ..... H. H. Lyman.
20. An Address on various insects ..... Dr. Jas. Fletcher.
21. Membracidæ ..... Geo. A. Moore.
22. Notonectidæ ..... Geo. A. Moore.
23. Remarks on Dr. Fletcher's New Species and Varieties of Canadian Butterflies ..... A. F. Winn.
24. Attempts to rear Cerambycidæ ..... G. Chagnon.
25. Capsidæ or Leaf Bugs ..... Geo. A. Moore.
26. Thecla Laeta Edw. ..... A. F. Winn.
27. Cyanide Bottle for Micro-Lepidoptera ..... Charles Stevenson.

Two field days were held, one at St. Hilaire, 24th May, and the other at Rigaud, July 1st.

Two cases of insects have been presented to schools with the hope of arousing an interest in insect study among the pupils, one to the McGill Normal School, and the other to the St. John the Evangelist School.

Five of the members attended the annual meeting of the Entomological Society of Ontario which was held in Ottawa and four papers from our Branch were read.

Our membership remains the same numerically.

Respectfully submitted on behalf of the Council,

(Signed.) Charles Stevenson,
President.

9th May, 1904.

The Treasurer's account showed a balance on hand of $58.10.

The Librarian submitted the following report:—

Our bookcase is full. One unit as authorized by the Society has been ordered, but has not yet arrived. The library contains many useful books, including "*The Canadian Entomologist*," Vol. I to X, bound and unbound.

The following were added this year:—

1 Bulletin No. 59, 1902, H. H. Lyman.
1 Bulletin No. 64, 1902, H. H. Lyman.
Paper on Plusidæ, Dr. Ottolengui.
7 Annual Reports of the Entomological Society of Ontario, 1895-1904.
1 Paper Book "Insects affecting forest trees, 1903."
A quantity of paper for copies of members' papers from A. F. Winn.
1 Bulletin No. 68, N. Y. State Museum by purchase.
Proceedings of the South London Ent. & Nat. His. Soc., 1902, L. Gibb.
Check list of Coleoptera, G. R. Crotch, M.A., 1874.
Label list of insects, Dom. of Can., 1883, A. F. Winn.
Bibliography of Canadian Entomology, 1902, Dr. Bethune.

The following were donated by Charles Stevenson:—

Monthly Bulletins, Pennsylvania, No. 4-9-10-11-12, Vol. 1, 1904.
6 copies of papers read during 1903.
The President's (Charles Stevenson) Annual Address.
Report of Annual Meeting at Ottawa, 1903.
Report of case of insects donated by our Society and arranged by Charles Stevenson.
29 parts of "*Canadian Entomologist*," containing incomplete volumes 17-18-19-22, by A. F. Winn.
45 Pamphlets and "Psyche" (11 vols.) from J. G. Jack.

(Signed.) A. E. Norris, *Librarian.*

The Curator read the following report:—

The cabinet is complete as far as the drawers are concerned and I am now ready for generous donations from the members. It should be our pride to have a good local collection of all orders if possible. The following members have contributed since the last Annual Meeting:—

Mr. Lachlan Gibb, 10 Butterflies and 34 Moths.
H. H. Lyman, 5 Melitæa and 3 Phyciodes Butterflies. "These 8 butterflies are not likely to be taken here."
A. F. Winn, 3 Ichneumons.
G. Chagnon, 80 Diptera.
D. Brainerd, 44 Moths.

Respectfully submitted.

(Signed) A. E. Norris, *Curator.*

The President, Mr. Charles Stevenson, read his Annual Address.

Mr. Gibb moved and Mr. Griffin seconded that these reports be accepted. *Carried.*

The following officers were elected for 1904-1905:

President ....A. E. Norris.
Vice-President ... .A. F. Winn.
Librarian and Curator .....D. Brainerd.
Secretary-Treasurer ... ...Geo. A. Moore.
H. H. Lyman.
Council ... ...Charles Stevenson.
L. Gibb.

Mr. A. F. Winn gave a talk on the Lycænidæ.

A. E. Norris "Hydrœcia" illustrated by lantern views and other slides of butterflies and moths.

Geo. A. Moore on the Leaf-Hoppers, Family Jassidæ.

Mr. Stevenson exhibited a specimen of *Aphodius erraticus* caught, June 1st, 1904, by K. R. Stevenson under stones at Maplewood, near Outremont. This is the first record of its capture in Canada. It was reported by Horn in the United States, and is an introduced species from Europe.

After the examination of specimens the meeting adjourned.

GEO. A. MOORE,
Sec.-Treas.

REPORT OF THE QUEBEC BRANCH.

The annual meeting of the Quebec Branch was held on the 19th November, 1904, at the house of the President, extensive repairs being carried on in Morrin College.

There were present: Rev. Dr. Fyles in the chair, Lt.-Col. Crawford Lindsay, secretary-treasurer, Rev. W. W. McQuaig, J. H. Simmons, Esq., Mr. Halton Fyles, Mrs. R. Turner, Mrs. Fyles, Mrs. McQuaig, Mrs. Simmons, Mrs. Seton, Mrs. Boulton, Miss Hamel, Miss Freeman, Miss MacLeod, Miss Hedge, Miss Bickell, Miss Johnson and Miss Winifred Fyles.

The minutes of the last meeting were read and approved.

The secretary stated that eight meetings had been held during the year, besides two field-days. Lectures had been delivered on the following subjects:—By the President: Pitcher Plant Insects—Insect Pests of the Oak—The Willows of Canada and the Insects that feed on them—Garden Pests and how to deal with them; by the Rev. W. W. McQuaig: Edible and Poisonous Fungi (two lectures); by Miss MacLeod: On Light and Colour.

The President then gave his annual address as follows:

I am glad to welcome so many of our members and friends to my house. Morrin College is undergoing extensive repairs, and will be in the hands of the workmen for some time to come. A few days ago I had our cabinet removed to a safe place in the laboratory of the college. I hope, when the repairs are completed, the college authorities will allow us, as in the past, to hold our meetings in that institution.

A few interesting things—entomologically speaking—have come under my notice in the past season:—

Vespa Diabolica.

In the 34th report of the parent Society, page 11, will be found a notice of a colony of this species which had their nest under the cap of a newel-post of a flight of steps to the verandah of the residence of J. H. Simmons, Esq. Attention was first drawn to this colony by a servant maid, who, while sweeping the steps, knocked her broom upon the post and brought upon herself an attack from the wasps. With a swollen and inflamed face, she rushed to her mistress, exclaiming: "Ah, Madame, les petites bêtes jaunes sont venues me piquez;" (Ah, Ma'am, the little yellow flies have stung me).

Through the kindness of Mr. Simmons, I am now able to lay the nest of the wasps before you. It contains, you perceive, one tier of cells only, and this was closely attached to the under side of the cap. The number of cells is seven hundred. Between the cap and the top of the post itself was a small space as there was between the side casing and the post. The insects worked in the confined space under the cap and carried on their operations in darkness. They found entrance and exit through a small hole in a joint of the casing. The means taken by the wasps to prevent intrusion by predacious insects is remarkable. They suspended a series of paper curtains, some fifteen in number, which closed up the space between the post and the inner sides of the casing, so that an intruding insect, groping in the dark, would find itself entangled in a veritable labyrinth. If it happened to strike the well guarded way of the wasps, it would doubtless meet with a warm reception.

Fig. 3. Larva of Wasp; dorsal view, greatly enlarged.

Fig. 4. Parasite of *Cimbex Americana*, showing under side, much enlarged.

It may be wondered how the larva of a wasp (Fig. 3), hanging in an open-mouthed cell, with its head downward, can retain its position. Last summer I had the opportunity of studying the live larva. I found a nest in which the first of the larvæ had attained their full growth. I found the creatures somewhat top-shaped, very broad at the shoulders so as to fill the opening of the cell and press upon the sides, and then gradually tapering to the extremity. The body ended in a pair of claspers which reached into the narrowed end of the cell. When a larva was turned out of its dwelling, I noticed that it extruded from its under side a series of excrescences as if to find a hold by means of these. I think we may say that the larva is held in place by its claspers, its pseudopodia, and by the pressure of its thoracic segments upon the sides of the cell.

A Battle Royal.

On May 29th, I witnessed, in the hangard at my place, a fierce contest between a female of *Vespa arenaria* and a spider. I separated the combatants, for I wanted the wasp for my collection. A few hours afterwards I noticed that the spider was dead.

A Parasite of *Cimbex Americana*.

Last fall, Miss Hamel brought me from Kamouraska, some larvae of *Cimbex Americana*. On the 7th September, there broke from the under side of one of these, near the hinder parts of it, a remarkable parasitic larva (Fig. 4). It was an inch long and was dirty white in colour with a row of continuous yellow folds, extending the length of the body on either side. It had an irregular dorsal line of brown and an irregular side line just above the yellow folds. On the under side there was an undulated line on either side. The after part of the body was darker than the rest. The head was small and the four or five segments following tapered towards the head. The anal segment was truncated and yellow. I have no doubt that this was a larva of *Opheletes glaucopterus*. A few days after this appeared I found a dead *Cimbex* larva some inches deep in the soil at the roots of a plant of *Aquilegia* that I was digging up. I inferred from this that parasitized *Cimbex* larvae buried themselves; and I placed the parasite I had on some earth in a flowerpot and covered it with damp moss. I am sorry to say that this treatment was unsuitable—the larva died.

Strange Food for Wire-Worms.

On the occasion of our field-day at Montmorency, the Rev. Mr. McQuaig and myself wandered off in search of fungi. On examining a specimen of the Fly Agaric *Amanita muscaria*, we found a wire-worm eating into the stipe of the fungus. The Czar Alexis of Russia died from eating this species of fungus; the wire-worm seemed to be eating it with impunity. The poison of the Fly Agaric taken into the system paralyzes the nerves that control the action of the heart.

A little further on we found a specimen of the most deadly of all the fungi, *Amanita phalloides*, known as the "Death-Cup" and the "Destroying Angel", for the poison of which there is no known antidote. It acts upon the blood, dissolving the corpuscles. Strange to say, we found a wire-worm apparently of the same species as the other, biting a way into this.

Fungoid Growth on a Wasp.

It is well known that insects are liable to destroying fungoid growths. Among some of the specimens captured by Miss Freeman, was one of *Crabro singularis*. Over the thorax and parts of the abdomen of this was such a growth as we are speaking of.

Captures.

On June 17th, a fine specimen of *Macromia Illinoiensis*, Walsh, was taken on the Louise Embankment. On June 27th, I found *Hylotoma dulciaria* at the Natural Steps, Montmorency. So late as September 12th I took a fine specimen of *Aeschna constricta* at a pond on Spruce Cliff. The species seemed to be plentiful. On September 27th, Mr. McQuaig found a female *Meloë angusticollis* in the same locality.

A very interesting paper by Mr. Albert F. Winn of the Montreal Branch was then read. It described in a charming way the haunts and habits of the water-lily moth, *Nymphula maculalis*, Clemens, found at Lake Charlebois, and the methods adopted for the capture of the insect. Some beautiful specimens of the moth, sent by Mr. Winn, were exhibited.

The Rev. Mr. McQuaig gave a graphic description of two fungi giving out very different odours. To the first, on the occasion of the field-day at Montmorency, he was drawn by the delightful perfume it emitted, which resembled that of Sweet Grass, but stronger. Let by the scent, he found the fungus in the recesses of a growth of young spruce and near the bolls of the trees. It was a species of *Hydnum*. It was remarked that perfumers might turn a knowledge of this to practical account, judging by the powerful scent retained by the dried specimens of the fungus exhibited.

Mr. McQuaig, continuing, stated that while taking a walk with the President in the woods near the Levis cemetery, they encountered the same fine perfume and, after a little search, found large patches of the fungus in the shade of the most entangled growths of spruce.

The other fungus he wished to refer to was a *mal*-odourous one, *Phallus impudicus*, known as the Stinkhorn. He gave a minute description of this, both in its egg-like stage and after its full development, when it emitted its overpoweringly offensive odour.

Mrs. Turner said that she had found several specimens of this fungus in her garden at "The Cedars", Island of Orleans. Numbers of Bluebottle flies were buzzing about them and settling upon them.

Mr. McQuaig explained that doubtless the offensive odour was intended to aid in the dissemination of the species. It attracted carrion insects and these carried away the spores which adhered to their feet.

The officers chosen for the year were:

President, Rev. Dr. Fyles; Vice-President, Miss E. Macdonald; Secretary-Treasurer, Lt.-Col. Crawford Lindsay; Council, Rev. W. W. McQuaig, Hon. R. Turner, Mrs. Turner, Miss Bickell, Miss Freeman.

Hearty votes of thanks were passed to the authorities of Morrin College for the countenance they have given the Association, to the President and the Secretary-Treasurer for their services, and to Mr. A. F. Winn for his valuable paper.

Report of Council.

The Branch now includes twenty-six members (twenty-three adults and three juniors).

The Treasurer's report is submitted and will no doubt be found satisfactory.

During the past year eight meetings were held at which interesting lectures were delivered and two enjoyable field-days were held.

Our thanks are due to the authorities of Morrin College for having continued to allow us the use of their rooms for our meetings, and also to the President, Rev. Mr. McQuaig and Miss MacLeod, for their interesting lectures.

Crawford Lindsay,
Secretary-Treasurer.

REPORT OF THE TORONTO BRANCH.

The eighth annual meeting and ninety-fifth regular meeting of the Toronto Branch, Entomological Society of Ontario, was held in the Provincial Museum, Toronto, on the 19th of May, 1904.

Secretary's Report.

I beg to herewith submit the annual report for the season of 1904:—

Our membership this year has been most gratifying in point of numbers, an increase of eight members over last year, and all in good standing, the total number now being fifteen.

During the last year we have kept up our subscriptions to publications as heretofore, and have been enabled to add doors to the fine large cabinet presented to the Society by Mr. McDonough, which now stands in the Ornithological room of the museum.

The permanent collection has been added to considerably, and through the efforts of our Curator a case of representative Butterflies found near Toronto, has been beautifully mounted and labelled and hung for public inspection.

Our specimens of Hymenoptera, Diptera and Hemiptera have also been sorted out, and each placed in their respective drawers.

The papers read and lectures delivered have been of a high educational order, shedding new light and knowledge, added to by the exhibition of specimens to illustrate the same.

Dr. Fletcher, of Ottawa, and Mr. Lyman, of Montreal, we are very greatly indebted to, for two of the most interesting and instructive lectures of the season.

Dr. Fletcher's lectures on "The Opening of Spring, and Spring Work" will not soon be forgotten by those fortunate enough to hear it. This meeting was splendidly attended, about fifty being present; the Canadian Institute and public schools being well represented.

Our financial statement this year has not been surpassed, no doubt owing to the increase in membership.

Your Secretary-Treasurer in closing, wishes to thank the members of the Toronto Branch for the help and courtesy extended to him, making his duties a pleasure to perform for the Society.

All of which is respectfully submitted.

J. Maughan, Jr.,
Secretary-Treasurer.

The following officers were elected for the ensuing year: President, Jr. Wm. Brodie; Vice-President, Paul Hahn; Secretary-Treasurer, John Maughan. Jr,; Librarian and Curator, J. B. Williams; Council, W. J. Fraser, Henry S. Saunders, J. H. Webb.

Lectures and Papers—Season 1903-4.

1st. J. B. Williams: "Butterflies in 1903 and Classification of same."
2nd. Exhibition of Specimens.
3rd. Arthur Gibson, Ottawa: "Some Work done in the Division of Entomology at Ottawa during 1903" (Published in Toronto World).
4th. Mr. Lyman, Montreal: "Moths of the Genus Gortyna and Hydroecia."
5th. E. M. Walker, M.B.: "Two collecting trips in Algonquin Park."
6th. Dr. Fletcher, Ottawa: "Opening of Spring and Spring Work."
7th. Annual Meeting; Dr. E. M. Walker and Mr. Paul Hahn: "Collecting in Algonquin Park". Illustrated by electric lantern.

REPORT OF THE BOTANICAL SECTION FOR 1904.

The Botanical Section of the Entomological Society of Ontario met for organization on the 7th of May, 1904, when the following officers were elected for the coming year: Mr. S. B. McCready, Chairman; Prof. Bowman, Vice-Chairman; Master H. C. Rennie, Secretary.

Nine fortnightly meetings were held during the season, at nearly all of which there was a satisfactory attendance, the average number present being about seven. Two very successful field-days were held, the first at Dorchester and the second at Komoka.

An interesting paper was read by Mr. Dearness on June 18th, on "Plant Societies", and many interesting talks on Botanical subjects were given during the year. A great variety of plants were brought to the meetings for examination and identification. The last evening of the season was devoted to fungi, of which an account was given by Profs. Bowman and Dearness.

S. B. McCready,
Chairman.

REPORT OF THE MICROSCOPICAL SECTION.

The Microscopical Section of the Entomological Society of Ontario has much pleasure in presenting its fourteenth annual report. The meeting for reorganzation after the summer recess was held on the 3rd of October, 1903, and the following officers were elected: Prof. J. H. Bowman, Chairman; Mr. R. W. Rennie, Vice-Chairman; Mr. C. E. Parsons, Secretary.

Prof. J. Dearness and the officers were appointed the Executive Committee for the year.

Thirteen meetings were held during the winter season, with an average attendance of nine members, besides a number of visitors. Papers were read or addresses given on the following subjects:

Aphids, Ants and Honey-dew: Rev. Dr. Bethune; Ferns, their Spores and Modes of Growth: Mr. S. B. McCready; The Inhabitants of an old Basswood Limb: Prof. Dearness; Barnacles Found on some Pine Logs: Prof. Bowman; Platino-Cyanide Crystals of Barium: Prof. Bowman; Collembola: Mr. F. A. Stuart; Sea-weeds from Santa Monica Bay, California: Mr. M. Westland; Algæ: Prof. Dearness.

These papers were illustrated by specimens and slides for the microscope. At nearly all the meetings a number of objects of interest and beauty were also exhibited and discussed.

J. H. Bowman,
Chairman.

REPORT OF THE LIBRARIAN AND CURATOR.

The following is the report for the year ending August 31st, 1904:

The number of bound volumes added to the library during the year was twenty-eight, making the number on the register 1,832. Among the new acquisitions there have been received volumes VIII and IX of the Harriman Alaska Expedition, being the two parts devoted to insects; Dr. Holland's Moth-Book, presented by the late librarian, Mr. J. Alston Moffat, to the Society as "an acknowledgment of its generosity in his declining years"; Sir George Hampson's Catalogue of the Noctuidæ in the British Museum, being volume IV of his "Catalogue of Lepidoptera Phalænæ"; and Rothschild and Jordan's "Revision of the Sphingidæ".

A large number of scientific magazines, bulletins of experimental stations, and other publications, have also been received. Many of these will be bound into volumes and the rest catalogued and arranged in such a way as to be readily accessible.

The number of volumes issued to members during the year was thirty-three.

The collections of Canadian insects have been increased during the year by the generous gift of 103 specimens (52 species) of Coleoptera and two specimens each of six species of Lepidoptera taken by Mr. Norman Criddle at Aweme, Manitoba. The local members have contributed specimens in various orders taken in the immediate neighborhood of London.

The Curator would very much like to receive specimens of almost all our Canadian insects to fill blanks in the cabinets and to replace old and imperfect examples. Any member who has specimens to spare would confer a favour by sending first a list of those which he is willing to present to the Society in order to avoid duplication. In many of the orders our collections are very meagre.

The removal of the Society's library and cabinets to the room in the Public Library building was satisfactorily accomplished last month, and no damage was done to either books or specimens. The increased space now available will enable the Society to find room for large additions to both the collections and the library.

Respectfully submitted.

CHARLES J. S. BETHUNE,
Librarian and Curator.

REPORT OF THE TREASURER.

Receipts and expenditures of the Entomological Society of Ontario for the year ending August 31st, 1904:

RECEIPTS.		EXPENDITURE.	
Balance on Sept. 1st, 1903	$293 34	Rent	$165 00
Members' fees	362 68	Pins, cork, etc.	57 38
Sales of pins, cork, etc.	90 59	Printing	701 23
Advertisements	35 50	Expense account	76 10
Sales of Entomologist	119 50	Annual meeting and report	176 05
Government grant	1,000 00	Library	22 06
Interest	4 15	Salaries	262 50
		Balance on hand	445 74
	$1,906 06		$1,906 06

We, the auditors of the Entomological Society of Ontario, hereby certify that we have audited the books and vouchers of the Treasurer and find them all well kept and correct, the above being a true statement of accounts up to August 31st, 1904.

S. B. MCCREADY,
W. H. HAMILTON,
Auditors.

J. A. BALKWILL,
Treasurer.

London, Ont., Oct. 25, 1904.

REPORT TO THE ROYAL SOCIETY OF CANADA.

The following is the report to the Royal Society of Canada from the Entomological Society of Ontario, through the Rev. C. J. S. Bethune, D.C.L., Delegate.

The Entomological Society of Ontario has now continued in active operation for two score years, and held its fortieth annual meeting in Ottawa on the 3rd and 4th of September last. Of the little band of enthusiasts who met in Toronto in April, 1863, for the purpose of organizing the Society, but three now survive, Dr. Wm. Saunders Rev. Dr. Bethune and Mr. E. Baynes Reed. It is gratifying to note that they have continued to take an active interest in the welfare of the Society from that time to the present.

"The Canadian Entomologist," the monthly magazine of the Society, is now in its thirty-sixth year of publication. The volume for 1903 contains 352 pages and is illustrated with six full-page plates and fifteen figures in the text, all from original drawings. The contributors number sixty-one and represent Canada, the United States, Great Britain, Germany, Luxemburg and Cuba. The principal articles may be grouped as follows: Descriptions of new genera, species and varieties in Lepidoptera by Prof. J. B. Smith, Dr. H. G. Dyar and Mr. G. M. Dodge; in Hymenoptera by Dr. W. H. Ashmead, Profs. T. D. A. Cockerell and H. T. Fernald, Messrs. J. C. Bradley, A. W. Morrill, J. C. Crawford, R. A. Cooley, C. Robertson, Rev. T. W. Fyles and Dr. S. Graenicher; in Diptera by Messrs. D. W. Coquillett, F. V. Theobald, and J. S. Hine; in Coleoptera by Prof. H. F. Wickham and Mr. C. Schaeffer; in Hemiptera-Homoptera by Prof. Cockerell, Messrs. A. W. Morrill, R. A. Cooley, A. L. Quaintance, G. B. King, E. B. Ball and W. T. Clarke; in Hemiptera-Heteroptera by Mr. C. Stevenson; and in Orpthoptera by Messrs. E. M. Walker and E. S. G. Titus. Thirty-nine new genera are described, 106 new species and eight new varieties and sub-species.

Life-histories more or less complete, are given of the following insects: *Crocigrapha Normani* and several Canadian species of Apantesis by Mr. Arthur Gibson; the strawberry Aleyrodes (*A. Packardi*) by Mr. A. W. Morrill; *Hydrœcia appassionata* found boring in Sarracenia by Mr. H. Bird; the Apple Bud-borer (*Steganoptycha pyricolana*) by Prof. E. D. Sanderson; *Mamestra laudabilis* by Dr. H. G. Dyar; and several species of Mosquitoes by Mr. F. V. Theobald.

Papers on Classification. Nomenclature and systematic Entomology; the Wasps of the super-family Vespoidea by Dr. Ashmead; Arctic Hymenoptera by Mr. W. H. Harington; Nomadinæ and Epeolinæ by Mr. C. Robertson; Prof. Aldrich and Mr. Coquillett on Culex; Mr. J. C. Bradley on the genus Platylabus; Mr. E. M. Walker on the genus Podisma in Eastern North America; Dr. Dyar and Mr. A. Bacot on *Aglia tau*; Mrs. Fernald on Coccidæ; Dr. Fletcher and Prof. Grote on Lepidoptera; Prof. Cockerell and Mr. Titus on Hymenoptera.

Collecting notes, and papers on the geographical distribution of species, are given by Prof. A. D. Hopkins on Forest Insect Explorations; Mr. Coquillett on the Phorid genus *Ænigmatias* in Denmark and Arizona; Mr. G. B. King on Records of Coccidæ; Dr. Fyles on Quebec Diptera; Mr. J. D. Evans on the Coleoptera of North-Western Canada; Mr. W. T. Clarke on Californian Aphilidæ; Butterfly notes from Toronto by Mr. J. B. Wil-

liams; Collecting in February by Mr. J. R. de la Torre Bueno; the capture of *Ægialites debilis* in British Columbia by the Rev. J. H. Keen.

Among the miscellaneous papers may be mentioned a House-boat collecting trip in China by Mr. C. L. Marlatt; a Coleopterous Conundrum by Mrs. A. T. Slosson; a Migration of Butterflies in Venezeula by Mr. A. H. Clark; the habits of *Ranatra fusca* by Mr. Bueno; the Spinning methods of *Polyphemus* by Mr. J. W. Cockle; papers on Coleoptera by Prof. Wickham, on Bees by Prof. Cockerell and Entomological notes by Mr. H. H. Lyman. There are also several reviews of new books by the editor and others.

The thirty-fourth annual report of the Society was published by the Ontario Department of Agriculture in March last. Its distribution has unfortunately been very much limited owing to the destruction of 5,000 copies by the disastrous fire in Toronto on the 19th of April. The volume consists of 116 pages illustrated with a portrait of the Rev. G. W. Taylor, four half tone plates of orchards affected by the San José Scale and sixty figures in the text; all of the blocks of these illustrations have also been lost in the fire.

The volume contains satisfactory reports from the Officers of the Society, the Sections in Botany, Microscopy and Ornithology, the Branches at Montreal, Quebec and Toronto, and from the Directors, Messrs. Young, Grant and Balkwill, on Insects of the year. Further notes on the season of 1903 are given by Messrs. Stevenson and Kilman, and extended reports by Dr. Fletcher and Prof. Lochhead. The latter, in his annual address as President, gave an interesting account of the "Progress of Economic Entomology in Ontario", and furnished further papers on "The Present Condition of the San José Scale in Ontario", and "A Key to the Insects Affecting Small Fruits". Dr. Fletcher contributed his very valuable "Entomological Record for 1903"; Mr. Arthur Gibson, papers on "The Insects Affecting Basswood", and "An Interesting Enemy of the Iris"; Dr. Bethune on "A Menace to the Shade-trees of London, Ontario", the Great Leopard Moth, and a memoir of the late Professor Grote; Dr. Fyles on "The Food-habits of Hymenopterous Larvæ";Mr. Jarvis on "Fly-tormentors of New Ontario", and a list of injurious insects taken in the Abitibi Region; Mr. A. J. Dennis on a remarkable experience in collecing moths at light in Manitoba. Dr. S. H. Scudder gives an interesting account of his "Hunting for Fossil Insects" in Wyoming and Colorado; and the late Mr. Moffat furnished a paper on his "Recollections of the past". Dr. L. O. Howard, United States Entomologist, was a welcome visitor at the annual meeting and gave two most interesting addresses, of which abstracts are given in the report, on "The Transmission of Yellow Fever by Mosquitoes", and the warfare that is being waged against the Cotton Boll Weevil in Texas.

It is with profound regret that we place on record the death of Mr. John Alston Moffat, which took place in London on the 26th of February. For fourteen years he had been the efficient Librarian and Curator of the Society and had endeared himself to all who frequented the rooms by his uniform kindness and courtesy.

INSECTS AND WEEDS IN THE NORTH-WEST TERRITORIES.

By T. N. Willing, Regina, Assiniboia.

It gives me a great deal of pleasure to be able to meet the members of the Ontario Entomological Society as a representative from the North-West Territories, a portion of Canada in which there is so much work yet to be done in the study of its insect life. Many of you have already ably assisted in this work and I hope to be able to call on you for yet more help in the identification of material collected. Moving about the country a great deal as I do in the capacity of chief Inspector of Weeds for the Department of Agriculture at Regina, my opportunities for collecting are much greater than for classification and study. As our Department has no official whose time is specially devoted to entomology, it falls to my lot to investigate insect depredations, and in this connection I may mention that preparations are being made for a reference collection of the insects injurious to crops. Fortunately the losses from insects in the Territories have not been heavy, but it would be too much to expect a continued immunity and there is no doubt a close watch must be kept to check promptly, if possible, any threatened danger from such a source. The annual visits of our popular and valued advisor, Dr. Fletcher of the Experimental Farm, have aided greatly in the dissemination of information relative to insects and weeds affecting crops, and I think no one has done more for the advancement of the study of natural history in the West than he.

Another help in this line is the work being done by our Territorial Natural History Society, which developed from the North-West Entomological Society, started by Mr. Percy B. Gregson, an untiring worker, who continues to be president. The Society is recognized by the Government and its annual report is printed as an appendix to that of the Department of Agriculture. The aim of the Society is to encourage the study of natural history in its various branches, giving prominence to the economic side, and also to gather material for collections which will be available for reference. Local branches are encouraged and records of the migration of birds are being made at points where observers can be found. Several of the members are keenly interested in the study of entomology and are doing good work, notably Messrs. F. H. Wolley Dod and Arthur Hudson, near Calgary, who make a specialty of the Noctuidæ and have added many new species.

It has been found that specialists have been exceedingly kind in identifying material sent them and my thanks are due to Dr. Fletcher and Messrs. Taylor, Kearfott and Dod for their services in this respect. Recently Rev. G. W. Taylor named some forty odd species of geometer moths which I had collected, and Mr. Kearfott has now in hand a lot of our western micros for study. Of Coleoptera I have a large number not yet classified.

During the season few insects attracted attention by their numbers. In May a multitude of hairy caterpillars were reported on the prairie north of Medicine Hat and proved to be those of a species of Apantesis. The appearance of such as were found on 30th May indicated that they were affected by parasites. Small pupa cases were soon found amongst the caterpillars, which were collected and from these ichneumon flies emerged about 25th June. No moths were obtained from the larvæ, but a small specimen of *Apantesis Williamsii* was taken with the net on 28th June where the larvæ had been so abundant.

In the same locality, but on the river flat, a grove of the box-elder, *Acer negundo*, was found to be stripped of its foliage by the larvæ of the

Lime-tree looper *Hibernia tiliaria*. On May 30th the larvæ were first seen and then were a half-inch in length. They fed voraciously and pupated about 18th June, one male moth emerging in confinement on 7th October. The moths of Tent caterpillars, probably *Clisiocampa fragilis*, which seems a very variable species, were noticed in abundance at two points north of Edmonton amongst the aspen, on 21st July, when they were just emerging from their cocoons. In several instances, two or three males were seen clustered on the cocoon from which females were apparently expected to emerge. Some larvæ of this species were taken at an earlier date south of Calgary from several of which Tachina flies emerged. About Regina, on 11th August, the weed *Chenopodium album* was noticed to have been destroyed by the larvæ of a small moth, not yet identified, many of the chrysalids of which, about a quarter-inch in length, were found in the withered remains of the leaves. Larvæ of the Beet moth, *Loxostege sticticalis*, were also prevalent on the same species of weed and in the same locality. These two last mentioned insects may, in this case, be looked on as beneficial in helping to destroy a weed responsible for considerable loss to the grain growers. At harvest time complaints were received of the Grain Aphis being so abundant on wheat north of Wapella that binders were stopped by the canvas slipping and the Aphids were removed by the shovelful.

While no appropriation is made by the Territorial Government for the control of insect pests, owing to the necessity not being forced upon them, a large amount of money is expended in the crusade against weeds officially proclaimed noxious. While, by legislative enactment, power is in the hands of the inspectors, fifty of whom are employed for a short period during the summer, to have a crop destroyed; it is seldom found necessary, the farmers being mostly willing to do their best to eradicate weeds when their attention is drawn to the appearance and the noxious character of such weeds as may be found in their crops or about their places. The estimated area cropped during the past season was over 1,800,000 acres and if even a fraction of a bushel per acre were the loss in yield sustained through weeds it will be seen that it would represent a sum of money well worth saving. Educational work is pushed close after settlement by means of institute meetings, bulletins and displays of mounted or green specimens of weeds. The difficulties that inspectors have to contend with are great, one being the fact that the population of some districts is of a very mixed character, as indicated by the fact that twelve distinct languages are spoken in one district within a radius of twenty-five miles. The early plowing of summer fallow and subsequent surface cultivation, followed by harrowing of the growing grain, is the method generally recommended for the subjection of annual weeds. Working of the soil in this way results in increased crops of grain, which well repay the labor. Spraying has been recently advocated by some, but is not looked on with favor by the most practical men and will probably never be adopted to any extent in the prairie country.

In many districts there is a perceptible improvement in the appearance of the fields since the inspection system was begun.

In the weed ordinance there is a clause which prohibits the sale for seed of grain containing seeds of noxious weeds, and this is quite an aid in preventing the spread of weeds, but unfortunately very dirty grain may be sold for feeding purposes without restriction.

Dr. Fletcher, in commenting on this paper, spoke in high terms of appreciation of Mr. Willing's work in the Northwest, having known him for many years, and having had many opportunities of observing his work and methods. Mr. Willing, he stated, has charge of all the weed inspection

and insect investigation in Assiniboia; he is an enthusiastic and capable man in his department, and an excellent collector. He has helped specialists in Entomology very much by procuring varieties, having, for instance, been the discoverer of *Apantesis Quensellii*, var. *turbans*.

Mr. Willing was educated in Ontario, and then went to the Northwest where he spent ten years on a farm and in ranching. He thus acquired a thorough knowledge of the country and became well prepared for his duties as inspector of weeds and insects throughout the Territory. Happily in that part of the Dominion the farmers are ready to accept and profit by the methods taught them by their instructors. In Ontario, on the contrary, the farmers have little respect for Entomologists and do not appreciate the value of their suggestions. The Northwest settlers came to the meetings from all directions to hear what he and Mr. Willing had to tell them and were anxious to learn all they could regarding such matters as the proper methods of fallowing, times for sowing, means of fighting weeds and insects, etc. He met with many young men in the Northwest who had come from the older Provinces with the intention of spending a year or two in the new country. It usually ended in their remaining there, and in almost every case they were doing well. Among these men he found a keen appreciation of this scientific work, and an eagerness to learn all they could about it. The farmers generally derived much benefit from the very good work that Mr. Willing was carrying on. He was also advancing the knowledge of plants and birds and insects in the schools, building up the Natural History Society, and in one way and another developing scientific methods and causing the farmers to adopt them. Dr. Fletcher concluded by saying that he was anxious to let the Society know how valuable a work Mr. Willing was carrying on in the Northwest, and how much it was appreciated there, and he also wished to express the gratification that all the members present felt that Mr. Willing should have undertaken so long a journey in order to participate in our annual meeting.

INJURIOUS INSECTS OF THE SEASON 1904.

By Prof. W. Lochhead, Ontario Agricultural College, Guelph.

It is clear that the damage done by insects in 1904 has been below normal. The Pea Weevil, the Hessian Fly, and the Codling Moth, which wrought much damage in previous years, have not been very much in evidence this season. The causes which operated in the controlling of insect pests are difficult to understand. So far as 1903 and 1904 are concerned, however, we feel pretty certain that the climatic factors have had very much to do with the control of the number of injurious insects. The summers were cold and wet, which condition acts strongly on larval life. Sudden changes of temperature and moisture are very hurtful to larval existence, and it would seem that these causes were the main ones in controlling the injurious insects this season.

Insects of the Orchard.

Our Fruit Station experimenters do not report much injury from fruit insects this season. As a rule they term it an "off year". From Trenton, Mr. Dempsey reports that the Green Apple Aphis, the Pear-tree Psylla, the Plum Curculio, and the Codling Moth could readily be found, but no seri-

ous damage was done; at Walkerton, Mr. Sherrington reported few insect pests; Mr. L. Woolverton, at Grimbsy, says that the season is remarkably free from insect pests; Mr. A. W. Peart, of Burlington, mentions only the Curculio; Mr. Caston, of Craighurst, reports very few insects; Mr. Jones, of Maitland, mentions the Codling Moth as doing some injury, and states that very few insects were in evidence this season; Mr. M. Pettit, of Winona, reports the Curculio as being very bad; and Mr. Hilborn, of Leamington, had trouble with the Cherry Aphis and Peach Borers.

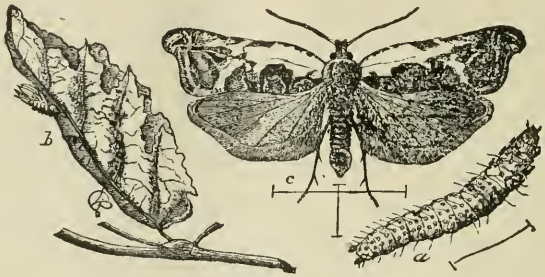


Fig. 5. Apple-leaf Sewer (magnified).

The Apple-Leaf Sewer (*Phoxopteris nubeculana*, Clem.) (Fig. 5), one of the Leaf-Rollers, was quite abundant, and did cosiderable damage in some orchards near Winona. In the orchards of Jos. Tweddle, Fruitland, which I visited, the lower leaves were practically free from this insect, but they were very prevalent in the topmost leaves. The owner informed me that before the trees were carefully and systematically sprayed nearly every leaf was infested, and he attributed the presence of the Sewer in the topmost leaves to the fact that it was almost impossible to treat properly the upper twigs of the very large trees.

The caterpillars (Fig. 5*a*) are about two-thirds of an inch in length when the leaves fall in autumn. In color they range from green to greenish yellow. There are two rows of light-colored spots beside the middle line of the back, and one or two along each side, each spot provided with a hair. Its head and shield of next segment are yellow.

The leaves are folded by using the silk threads which the caterpillar spins as draw-threads. The edges of the leaf are soon drawn together, which, when glued, form a hollow case. (Fig. 5*b*.) Within this case the caterpillar feeds upon the green tissue. Leaves frequently give indications of being tied or folded over at different times, according to growth of larva. Mr. Tweddle, always a careful orchardist and a strong believer in cleanliness about an orchard, believes that he can control this insect by thorough spraying in the summer with arsenite of lime.

The life history appears to be as follows: The winter is passed in the folded leaf as a larva; in early spring the larva transforms to a chrysalis, and in May the adult moths appear. Soon after, or in early June, the eggs are laid on the leaves, and caterpillars appear in a few days. Small folds are first observed, which do not involve the whole leaf, but finally the entire leaf is folded over. There is, thus, but one brood per year.

In the Fruitland district, the first brood of the Codling Moth was not so destructive as the second, although it damaged the Yellow Harvest, Astrachan, Duchess, and St. Lawrence varieties. The second brood of larvæ was abundant in August, and damaged the Baldwins and Greenings.

In other districts the Codling Moth was not very destructive.

The Plum and Apple Curculios were abundant throughout the Province. In the Winona district, where spraying was altogether neglected, the plum crop was very seriously damaged.

The Apple Curculio was most destructive in orchards that had been in sod for a period of years. In one orchard it was noticed that the pear trees in a row next to an open drain, which had not been cleaned out for some time, being full of leaves, etc., were badly attacked by the Curculio, while the trees in the centre of the orchard, where the ground had been cultivated, were entirely free from the pest.

The Peach Borer was reported as being abundant in several portions of the peach areas.

The Grape Thrips were unusually abundant in the vineyards of the Winona district. As a rule nothing was done to control them, and little harm seems to have been done by them.

Insects of the Garden.

The Raspberry Saw-Fly (*Monophadnus rubi*). This insect does not often call for attention, but this year reports came in early in June from a large grower near Fonthill that "numberless green larvæ were devouring the leaves of raspberries". An application of Paris Green put a stop to their ravages.

Wireworms did considerable damage near Burlington by destroying acres of melons and tomatoes. The plants would make a good start, but in a few days they would turn yellow and wilt. When such sickly-looking plants were pulled wireworms were found on the root stock.

Cabbage Root-Maggots continue their depredation year after year without apparent hindrance. Many growers of cabbages confine their patches to clay soil, for they found that nearly every plant succumbed on sandy soil. It seems strange that growers will not take the trouble to apply the tar-disk when the plants are set out, or to use one of the many solutions which are at least partially effective. They prefer to replant rather than go to the trouble and expense of using preventive measures.

The Onion Root Maggot was also very destructive this past season. This pest is even more difficult to treat than the Cabbage Root Maggot, but good results can be secured by the use of a solution of insect powder, or by Cook's Carbolic Wash.

The Carrot Rust-Fly (*Psila rosæ*) was severe at Barrie this season, and many specimens were sent to me which showed the characteristic rusty colored channels on the roots. This insect winters over in the ground in a puparium, and the winged flies emerge in spring to lay their eggs on the young carrots. Late sowing seems to be the most practicable treatment, for, although washes may be used to advantage, few growers will take the trouble to treat their carrots.

Currant Worms (*Nematus ribesii*) were very abundant on gooseberries and currants. Many cases are reported where the bushes were completely stripped of their leaves before the owner was aware of the presence of the worms.

Potato Beetles (*Doryphora decemlineata*) were reported as being more abundant than usual.

Asparagus Beetles are plentiful in the southwest section of the Province. The 12-spotted species (*Crioceris 12-punctata*) is by far the more abundant species, although in the Niagara region the other form is more numerous.

Red Currant Aphis (*Myzus ribis*) is one of the most common insect pests of gardens. The cause of the reddish-purple swelling of the leaf is not known by most people, but if they would only observe carefully and continuously the currant leaves, and watch the development of the swelling as well as the multiplication of plant lice, they would have no hesitation in concluding that the swelling is due to the punctures of the Aphids.

Lettuce Aphis was quite destructive in some greenhouses in the latter part of May.

Radish Maggots were very numerous in most sections. On heavy clay soil in the Berlin section they ruined the entire crop, but in lighter soil only about two-thirds of the crop.

The Strawberry Weevil. A correspondent from Oakville reported in early June that the Strawberry Weevils were abundant in that locality and had done considerable injury. The report said: "I notice that the beetles commit their depredations largely in the second year patches, the first year patches being comparatively free from their attacks. The damage done in this neighborhood is serious in some cases—in one case at least one-third of the blossoms have been nipped off. The 'Williams' variety which is largely grown here is suffering most". Specimens were sent me for identification, with a request as to best method of treatment.

The Strawberry Weevil is a very small snout beetle not more than one-tenth of an inch in length, with the snout about half as long as the body. There is but one brood a year, and the life-history seems to be about as follows: The adults winter over in protected places, and at the time of the first blossoming of the strawberries, usually about the 1st of June, they begin to appear in large numbers. The females puncture the buds of unopened blossoms and deposit an egg within; then to prevent the development of the bud, puncture or cut the stalk of the flower.

Larvæ appear in a few days, and these feed on the pollen. In about a month they reach full size, and in a cavity in the bud transform to pupæ. There the pupæ remain for about a week before becoming adults.

The work of the weevil is confined to pollen-bearing or staminate varieties, and the damage in due to the destruction of the pollen used in fertilizing the pistillate varieties.

The following methods of controlling this insect have been advocated: 1. *By covering the beds* with muslin or other light cloth a week before the first blossoms appear, and keeping them covered until the first berries are ripe. 2. *By cultivating pistillate varieties* which bear no pollen. 3. *By planting an early staminated variety* as a trap crop. 4. *By clean culture.* It is probable that a good repellant would be an effective method of treatment, but more experiments are necessary to verify this point. Spraying with Paris Green is not effective as the beetles feed within the unopened bud.

Insects of Garden Ornamentals.

The Hollyhock Borer. In July many hollyhock stalks near the College broke down near the base. Upon examination every broken stalk had its pith tunnelled for about half way up by a large lepidopterous borer resembling a cutworm. On the side of the stalks holes could be seen through which the larva entered. At this time the borer was about an inch and a half in length, was smooth and cream colored; light brown and cream colored, stripes ran lengthwise of the body, with darker spots along spiracular area on each side.

The Aquilegia Borer. At the same time the Garden Aquilegias were being destroyed by a large borer which worked in the crown of the plant. The borer was about an inch and a half long, was reddish or pinkish color, with a white line down the middle of the back. I was unable to rear these borers to maturity. Dr. Bethune, to whom I mentioned the occurrence, is of the opinion that these borers are the larvæ of *Papaipema*, probably *P. purpurifascia.*

The Dahlia Stalk-Borer. On the 30th of June a correspondent from Strathroy wrote me as follows: "We raise a number of Dahlias and this year we are greatly troubled with a worm which bores a hole in the stalk and works upward and also downward inside the stalk. It is about three-quarters of an inch in circumference, brown in color with fine white stripes forming rings on the back and sides. Some may be completely ringed." On July 23rd, I received specimens of infested Dahlia stalks, with an added note that "the borer, early in the season, appears to work upward, but later downward, even to the bulb. As soon as we find a plant that has been bored, we make a slit in the stalk with a sharp knife, and follow either way till the borer is captured. The incision is then carefully drawn together and bound with soft rags. So far we have lost no plants entirely, although many have been attacked, and some plants several times".

The Primula Spring-Tail. Many florists find great difficulty in growing Chinese Primroses from seed. The seeds apparently germinate and are perfectly healthy, but in a short time the heads of the seedlings, that is the seed leaves, disappear. Frequently seedlings develop sufficiently far to produce the seed leaves, and when once they have reached this stage they have no difficulty in growing into Primrose plants. In the College greenhouse some of the germinating boxes in which were planted Primrose seed, developed quite normally, while in boxes close by the young seedlings did not develop very far before they disappeared. It occurred to the florist, Mr. W. Hunt, that the cause of the trouble was some insect pest. On examination I found that the surface of the soil of the germinating boxes contained immense numbers of minute Spring-Tails. It is usually stated in text books that the Spring-Tails do no damage to the plants. Dr. J. B. Smith, in his "Economic Entomology", writes as follows regarding Spring-Tails: "Spring-Tails are found in moist localities, wherever decaying matter occurs. In manure beds they often occur in millions, and on warm days may come to the surface in astonishing numbers. They are often found in damp cellars on any vegetable matter stored there, and are sometimes accused of promoting decay. As a matter of fact, these insects are never injurious. Healthy vegetable tissue is not attacked by them, and their mouth parts are adapted for food of moist or soft tissue only, hence a decaying or bleeding spot attracts them. They are sure to occur on manure and on manured land".

Suspecting Spring-Tails of gnawing off the leaves of the Chinese Primroses, we planted some more germinating boxes in the hope that we might be able to settle the matter, and the boxes were kept in the Biological laboratory, where it was under constant observation. Although I was not able to detect the Spring-Tails at work on the seed leaves, yet if they are found on soft vegetable tissues I see no reason why they might not develop a taste for the young seed leaves. Experiments will be conducted later to find out the best way of treating infested soil. It is very probable that some mineral or commercial fertilizer will act as a repellant, and keep the soil free from these tiny pests.

Some Household Pests.

It would appear as if the Buffalo Carpet Beetle (Fig. 6) was gradually extending its sphere of operations in Ontario. Reports reach me from widely separated points of its presence in injurious numbers, and requests are freely asked for the best remedies. This insect is not an easy one to control, and only long continued persistent efforts will eradicate it. First of all the carpets should be taken up, thoroughly beaten, and it would be advisable to spray these with benzine while they are out of doors. The bare floors should be swept and dusted and washed with hot water. Careful attention should be given to the cracks in the floor, and it would be well to pour some benzine into the cracks, then, after it has evaporated, to fill up these cracks with putty or plaster of Paris. The cracks are the best breeding places for the insect, and these should be done away with if possible. Rugs should be used rather than carpet, for experience shows that the edge of the carpet is most liable to injury from the attacks of this insect. In rooms where the Carpet Beetle has effected an entrance, it would be well to leave the edges of the carpet free, so that they may be examined freely at intervals. If the house-keeper carries out the measures which I have indicated, she will have little trouble from the operations of the Carpet Beetle.

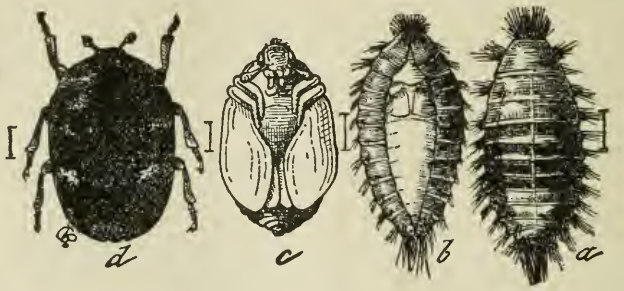


Fig. 6. Buffalo Beetle; *a* larva (destructive stage); *b* pupa within larva skin; *c* pupa; *d* beetle—all much magnified.

Powder Post Beetle. This minute beetle belongs to the genus Lyctus. It is more or less common throughout the Province, and many inquiries have been made during the past season as to the name of the insect which is converting some of the oldest and most valuable furniture into powder. The cause of the injury is a minute beetle called the Powder Post Beetle. It not only is injurious to old house furniture, but it is an insect to be dreaded by wood workers generally. This minute beetle passes the winter in the wood, and the eggs are deposited in the spring. The grubs, on hatching from the egg, begin to operate in all directions through the wood. There they remain until full grown and transform to the pupa stage, and in a short time afterwards they emerge as adult beetles. It is probable that there is but one brood annually. These insects prefer very dry wood material. The best methods of treatment for this particular insect are: First, to subject infested timber to a thorough steaming in a tight room, or to a very high temperature in a kiln, or to make applications of coal oil or benzine to the infested parts. I have advocated the use of hydro-cyanic acid gas.

Mites in Flour. Occasionally packages of flour have been sent in which showed the presence of Mites. Naturally the house-keeper is averse to using flour containing Mites, and inquiries are made as to the best method

of dealing with infested flour. These Mites are the common *Tyroglyphus longior*. I have recommended the thorough cleaning of the flour bin as one of the first essentials. If the owner does not care to throw out his flour or use it for other purposes, he may fumigate it with carbon bisulphide or hydro-cyanic acid gas. After thorough ventilation there is no danger whatever from poisoning due to the use of either of these chemicals.

Some Bot Flies of our Smaller Mammals.

Two interesting cases of infestation by bot-fly larvæ came under my notice this summer. The first was that of a kitten which had a large growth on the neck. Upon opening the growth a large bot maggot was taken, which measured more than an inch in length and more than half an inch in diameter. The second case occurred on a rabbit which had a tumor-like growth on the neck.

There seems little doubt that the larva taken from the rabbit is *Cuterebra cuniculi*, Clark, (Rabbit Bot-Fly), and as the form taken from the kitten's neck is very similar, it is probable that it is the same or a very closely allied species.

The Rabbit Bot-Fly (adult) is quite large, and resembles to some extent a bumble-bee. Its head is black, the upper surface of its thorax is yellowish and hairy, and its abdomen blue-black, with the exception of the first segment which is covered with yellow hair.

The larva, as will be seen by an examination of the specimen is a large, black spiny maggot. It has two small hooks at the anterior end by means of which it can cling to linings. It is sometimes stated that bots which live in tumors have no oral hooks but only fleshy tubercles. The rows of spines no doubt serve in locomotion.

All the larvæ of bot-flies descend to the ground, where they burrow to some extent. There they transform to pupæ within a puparium, and remain as such until spring, when the adult flies emerge. The adults are very conspicuous insects, and are fond of sunshine.

Osborne states that the egg and early larval stages of this bot-fly are unknown. Much investigation has been done with regard to the bot-flies, which are parasitic on our large domestic animals, such as sheep, cow, and horse, but very few studies of importance have been carried on with the bots which parasitize our common wild animals. Every observation is of value, hence for this reason I have presented these notes.

RECENT EXPERIMENTS AGAINST THE SAN JOSE SCALE.

By Prof. W. Lochhead, Ontario Agricultural College, Guelph.

In the last report of the Entomological Society I called attention to the excellent results which were being obtained by the use of the lime-sulphur wash. The great objection against the general adoption of this wash was the difficulty of preparation and of application. It was noted, however, by many of the fruit-growers who prepared this wash in large quantities that it was not so difficult to prepare as was anticipated.

Occasional experiments had been conducted last year to determine if it were possible to prepare the lime-sulphur wash without the prolonged boil-

ing that was necessary. Early in the spring Dr. E. P. Felt, State Entomologist at Albany, New York, asked me to try the following mixture:

Lime	25 pounds
Sulphur (flowers)	20 pounds
Sal soda	12½ pounds
Water	1 barrel

The method of preparation was as follows: Put five or six pails of hot water into a wooden barrel, add the lime quickly following the sulphur and sal soda, and stir until the slaking is practically completed. It may be necessary to add a little cold water at intervals to keep the mixture from boiling over. After the violent action has ceased, cover the barrel to retain the heat, and allow to stand from 15 to 30 minutes. Dilute to the full quantity and apply.

After advice from the Department at Toronto, Prof. Harcourt and myself were urged to test not only the above formula but also another lime-sulphur wash in which caustic soda is used, the formula being:

Lime	30 pounds
Sulphur (flowers)	15 pounds
Caustic soda	5 pounds
Water	1 barrel

The method of preparation was as follows: Slake two-thirds of the lime with water enough to prevent either burning or drowning, and during the process sift over and stir in one-half the sulphur, then add the remainder of the lime and more water, and as the boiling continues stir in the balance of the sulphur, adding water as needed, stirring to help the combination. While the mixture is still steaming add one-third of the caustic soda, which will cause violent boiling, and before this is over add another third. If then the mixture has not reached a brick red color add the remainder, and after standing for a time dilute to the required amount. The formula was first tried by the Experiment Station at Geneva, and is, consequently, known as the Geneva Formula.

Prof. Harcourt and myself, acting in co-operation with a special committee appointed by the Niagara Fruit Growers' Association, made arrangements to test the two lime-sulphur mixtures. The first experiment was tried in the orchard of W. H. Bunting. The application was made on the 23rd of April. The trees were not over thrifty and were well covered with scale. Next, one barrel of the lime-sulphur sal soda wash, was applied on trees in the orchard of Geo. Robertson, two trees of which were badly infested. One barrel of same mixture was applied on several badly infested trees in W. C. McCalla's orchard, and one barrel of the same mixture in Mr. Griffith's orchard, one tree of which was badly infested. A barrel of each kind of wash was applied on badly infested trees in the orchards of Messrs. Secord, Titterington, and McArdle.

In the preparation of both of these mixtures there was little trouble in obtaining the characteristic amber color of the well boiled lime-sulphur combination, but it was found that quick slaking lime should be used and that too much water should not be present, and that with hot water better boiling is secured with probably better results.

These orchards were visited in July and August by the committee and ourselves, and in every case little or no difference could be seen in the numbers of living scale on the trees sprayed with these mixtures and those sprayed with the usual boiled-lime-sulphur wash. Dr. Felt, in a recent letter, reports that excellent results have been obtained from this season's work with

the lime-sulphur sal-soda wash. The ease with which these mixtures can be prepared will greatly recommend them to the small fruit grower who has not sufficient trees to warrant the installing of a steam boiler plant.

In the discussion that followed the reading of this paper it was stated that the "McBain Mixture" was too expensive, as it cost $2.50 per barrel, while the lime-sulphur only cost sixty cents. Comparisons had been made by treating alternate rows of trees with the two compounds. When examined in the middle of July, no difference could be observed and there were badly infested trees in each row; the same condition was found in August and again in September. As a result it seems that the one mixture is just as effective as the other, and consequently the expensive one is out of the market. At the last inspection some live larvæ of scale were still found on trees which had been badly infested at the outset. The lime-sulphur mixture was made with 15 pounds of the former and 17 pounds of the latter, and boiled about an hour by which time it had reached the red amber color stage.

Evening Session.

A public meeting of the Society, to which the people of London were invited, was held in the Normal School on Wednesday evening, October 26th, by kind permission of Principal Merchant. Though the weather was inclement, a rainy afternoon being followed by the first snow of the season, the attendance was very good and the lecture-room was well filled. At eight o'clock the chair was taken by Dr. James Fletcher, Entomologist and Botanist of the Dominion Experimental Farms; after a few introductory remarks he called upon Professor Lochhead to deliver his address, as President of the Society.

RECENT PROGRESS IN ENTOMOLOGY.

(Annual address of the President.)

By Wm. Lochhead, B.A., M.S., Professor of Biology, Ontario Agricultural College, Guelph.

Another eventful year in the history of the Entomological Society of Ontario has just passed, and we are met again to exchange greetings, and to gather information through the exchange of opinions and the reporting of observations. The Annual Meeting of our active members, all interested in a common cause, cannot help but be a tonic in its effect. We return to our separate fields of work stimulated to renewed activity, and refreshed by the mutual exchange of opinions.

While encouraged by the meeting of so many of our members, we are also saddened by the thought that one of our oldest and most active members has passed away since our last meeting. Mr. J. Alston Moffat, our elder brother, is no longer here to welcome us to our own home. For fourteen years Mr. Moffat was Curator and Librarian of our Society, and for more than thirty years was an active worker in the field of Entomology. He died on Friday,

February 26th, after an illness of six months. His services for us will be long remembered, and his kind attention will not soon be forgotten by those who had occasion to use the collections and books of the Society.

I am sure we were all pleased when Dr. Bethune consented to assume the duties of Librarian and Curator, in addition to his other duties as Editor of the *Canadian Entomologist*.

It is the privilege of the President to review the progress of Entomology, and to note the chief entomological contributions of the past year. In my last year's address I reviewed the progress of Economic Entomology in Ontario during the last fifty years. It is unnecessary to state at the outset that it is impossible to deal with Ontario or Canada apart from our great neighbor to the south of us. In Entomology, as in other branches of science, the two countries are one, and there are no boundaries between them. The very fact that some of the prominent United States entomologists are present at our Annual Meetings, and some of our members at theirs is strong evidence that we are working together to the same end. On account, however, of their vastly greatly appropriations and facilities for entomological investigations, they have taken the lead, and we have come to look to them for both inspiration and suggestion in the prosecution of our work.

Great problems have come up for solution in the last few years both in Canada and United States. The first problem to which I shall refer was the control of the San Jose Scale. Hundreds of investigators have been studying this insect with the object of finding simple, effective methods of destroying it. During the progress of the investigations many new insecticides have been tried, and new spraying machinery has been contrived, with the result that our knowledge of insecticides has greatly increased. Among the many insecticides prepared, one in particular may be mentioned on account of its cheapness and effectiveness. This is the *lime-sulphur solution*, which is now almost universally used in controlling the scale. Incidentally, also, it was found that it possessed fungicidal properties of great value, and it is now possible to control the *Peach leaf-curl* at the same time that the scale is treated.

Experiments are now in progress to find an easier method of preparing the lime-sulphur solution, which many fruit-growers' found difficult to make.

It would appear that many important additions to our knowledge of insecticides and fungicides may be looked for in the near future, for the entomologist is now working in co-operation with the chemist and physiologist.

The second problem to which much attention is now being given, is the determining of the value of parasites in the controlling of injurious insects. As you all know, there are entomologists who believe that there is no need of spraying to control insects. They bring forward the evident fact that a balance is maintained in wild nature, through the operation of parasites and predaceous animals when there is a limited food supply, and that man has interfered with the order of things by his clearing of the land and his planting of large areas, and by his ruthless destruction of birds and other animals which prey upon injurious forms. These entomologists believe that in time, the *balance* would again be established; that the beneficial forms would keep the injurious forms under control. The main objection to this argument is that the establishing of this *balance* is slow, too slow for the farmer and gardener who would lose heavily during the return swing of the balance.

Moreover, when foreign pests are the disturbers of the balance, many years may be required to bring them under control, for it is well-known that predaceous forms tend to leave foreign pests severely alone; they have, as it were, an aversion to imported food. It becomes necessary then, in such

cases, to import the insects which prey upon the pest in its foreign home. There have been two or three signal successes in this direction. The first and best known was the importation of the Australian lady-bird *Vedalia cardinalis* for the purpose of preying upon the *Fluted or Cottony Cushion Scale* of the orange groves of Southern California. After a careful study it was found that this scale had come from Australia and there it is not particularly destructive. There it is preyed upon by several predaceous insects, and it was thought advisable to import these and to place them among the infested orange groves. One of these lady-birds soon increased rapidly in numbers, because it preyed upon the Cottony Cushion Scale, and saved the orange groves.

The second successful case not so well-known is that of the South African parasite of the Black Scale, *Lecanium oleæ*, which infests the olive and orange trees of California. This parasite known as *Scutellista cyanea*, a species of fly, was imported from South Africa, first to Louisiana, afterwards to California, where it has done wonderful work against the Black Scale. The larva of Scutellista feeds entirely on the eggs of the scale, and a study of its habits shows that it is admirably adapted for the control of the Scale. Its resting period occurs when the Black Scale is resting in the larval stage; consequently the absence of the food supply of eggs at this time does not interfere with its development. The fly has now become widely spread, and the olive and citron orchards have been fairly well cleared of the scale which threatened their destruction. Arrangements are now made for the breeding of the Scutellista at Los Angeles, and for the distribution of colonies to infested ranches.

The third case of importation is that of the Chinese Lady-bird *Chilocorus similis*, for the control of the San Jose Scale. It will be remembered that Mr. C. L. Marlatt, Assistant Entomologist at Washington, was despatched to Japan and China about three years ago to learn more about the habits and distribution of the San Jose Scale in those countries. After a careful survey of many parts of Japan, Mr. Marlatt was satisfied that Japan was not the original home of the scale. He proceeded to China, and in the Pekin markets he found scale readily on fruit raised in the region south of the Great Wall. Further examination revealed several forms which preyed upon the scale and kept it in check. One of these predaceous forms was a lady bird, and this one appeared to be doing most to control it. He sent a large number back to Washington, but unfortunately only a few survived. By careful breeding, however, these multiplied, and in time small supplies were sent to different States for liberation in orchards infested with the San Jose Scale. Up to the present time the Lady-birds have not done well, with the exception of those sent to some Georgia orchards.

The fourth and last experiment of this nature to which I shall refer is the recent introduction of a Guatemalan ant, called the *Kelep*, to prey upon the Cotton-Boll-Weevil of the cotton plantations of the South. This species of ant was discovered in Guatemala, where it "attacks and kills the adult boll-weevil thus permitting the regular harvesting of a crop of cotton, even under conditions favorable to the weevil. It is carnivorous and predaceous; it injures no form of vegetation and takes nothing from the cotton plant except the nectar secreted for it on the leaves and floral envelopes." It stings and paralyzes the weevil and frequently tears the weevil to pieces. Colonies of this ant have been established in Texas, but recent reports are not encouraging.

It will be seen, therefore, that we can already point to some cases of successful application of predaceous and parasitic insects to the control of inju-

rious forms, but it must be confessed that the number of such cases is remarkably small. Too frequently in popular talks and newspaper articles the exceptional cases are referred to at such length and in such terms, that the impression given is that all injurious forms can be controlled in such a manner. So far is it contrary to the facts of the case that man must depend largely upon other means of saving his crops. I do not wish to leave the impression that parasitic and predaceous insects do not perform a very important function in holding injurious forms in check. I know that facts point otherwise, but we must not fold our arms and lull ourselves by the sweet delusion that all will be well with our crops, for the parasites will look after the insects which would do injury.

Reference must be made to the great interest that has arisen with regard to Mosquitoes and the Cotton Boll-weevil across the border. With regard to the latter insect, we Canadians, can do nothing directly, as cotton is not grown within our borders, but we should not be uninterested spectators in a struggle against an insect which threatens the cotton industry of the United States. We have cotton mills in Canada, and are dependent to a large extent for our raw supplies on the Southern States. A reduction of the cotton crop there would mean a rapid rise in the price of cotton goods in this country. We also know that Great Britain would suffer very heavily by a shortage of the cotton crop in the United States.

The Department of Entomology at Washington has been called upon for help in the fight with the Cotton-Boll-Weevil, and Dr. Howard is now conducting the campaign. A large appropriation has been placed at his disposal, and the outlook is quite encouraging.

It has been shown that with new cultural methods the weevil can be controlled. That the apparent evil may turn out a blessing is very probable. It may lead to a better system of cotton growing, which is desirable in many parts of the South.

The Mosquito question is one that is largely discussed in the Eastern and Southern Atlantic States, for these troublesome pests have always been most annoying and deadly in the neighborhood of the Great Cities of the coast. The Entomologists have shown by patient investigation that malaria and yellow fever are due to the bites of certain mosquitoes, viz., *Anopheles punctipennis and Stegomyia fasciata.* In the case of malaria the insect becomes infected by sucking the blood from an infected human being. The malarial organism, having thus entered the stomach of the mosquito, passes through certain changes of its existence in the body of the insect, and at the end of about eight days reaches the poison gland. After this time, if the mosquito bites another human being, the malarial organism is introduced into the circulation of the latter, and malarial fever follows. The organism causing malarial fever (the *Plasmodium malaria*) is the true parasite, and so far as we know finds the conditions necessary for its existence only in the human blood and this species of mosquito.

On to the relation between Yellow Fever and *Stegomyia fasciata,* I need not now enter into a discussion, for Dr. Howard dealt very fully with this subject in his address at our last Annual Meeting at Ottawa.

Although the Yellow Fever Mosquito is not with us, the Malarial Mosquito, and several other species are far too common in early summer in some localities, where they make life a burden by their continuous tormenting stings. (Fig. 7). Individually and as a Society we might do much to improve the conditions of living in mosquito-infested districts. We might emulate our friends across the line and form a *Mosquito Extermination Society.* This Society should enlist in its membership all persons interested

in this important matter, should place and carry out means of extermination, should secure information regarding the distribution of mosquitoes in this country, and disseminate information throughout the infested areas. It has been proved that mosquitoes can be exterminated from an infested locality by a thorough drainage of the meadows and swamps, and by careful attention to standing water in pools, ditches, ponds, tanks, cisterns, wells, cesspools, so as to have them drained or covered.

On account of the great importance of the subject, I would suggest that our Society take measures to begin an active anti-mosquito campaign. Much could be done during the coming year to call the attention of the public to the fact that mosquitoes can be exterminated, and I am sure that our public men throughout the country would come to our aid as soon as practicable propositions were laid before them. As Dr. Howard says: "When we consider the enormous sums of money spent for luxuries, how much more should be spent for bare comfort and peace!"

FIG. 7. Malarial Mosquito (Anopheles), male on left, female on right hand of figure.

The last illustration of Entomological work of great importance is the successful introduction of the Caprifig insect (*Blastophaga grossorum*) from Southern Europe for the fertilization of the Smyrna figs in California. For some years attempts had been made to produce Smyrna figs in California, but without success. The failure was due to the fact that the flowers of these figs were all female, and there was no natural mode of pollination. It is well known that the fine flavor of the figs imported from Smyrna is due to the fact that the fig flowers there are fertilized by pollen from the Wild Caprifig. When branches of the Wild Caprifig bearing figs are tied to branches of the

Smyrna fig tree an insect emerges from galls within the former and pollinates the female flowers of the latter.

After much labor the Blastophaga has now been successfully introduced into the fig orchards of California, where both Caprifig and Smyrna fig trees thrive as well as they do in Asia Minor, and successful means have been adopted for the caprification of the Smyrna figs. The value of this experimens to the United States will be above one million dollars a year.

As I have already stated, much work is being carried on to determine the value of insecticides other than Paris Green. Reference has already been made to the lime-sulphur solution which is now used extensively against the San Jose Scale. So effective is this insecticide that the fruit-grower may be said to have the scale at his mercy, and it will only flourish where the fruit-grower is indifferent and will not spray.

Experiments were carried on this year in the St. Catharines district by Prof. Harcourt of the Agricultural College and myself, in co-operation with a committee of the Niagara Fruit Growers' Association to determine the value of the lime-sulphur-soda mixture against the San Jose Scale. This mixture does not require boiling, hence is more readily prepared than the lime-sulphur mixture, now in common use in scale-infested orchards. It was prepared as follows: 20 pounds sulphur were stirred into hot water at the bottom of a barrel; 25 pounds of quick lime and 12 pounds of sal soda were put in and hot water added as needed. After thorough stirring the whole was covered and left for at least half an hour. When required for use dilute to 40 gallons. The results were quite satisfactory, and gave about as good results as were secured from the use of the lime-sulphur mixture.

Another lime-sulphur-soda mixture was also tried, caustic soda being used instead of sal soda. The formula is:

Lime.....30 pounds
Sulphur .....15 pounds
Caustic soda ..... 5 pounds
Water.....40 gallons

In some localities *arsenite of lime* has been used extensively instead of Paris Green alone and with Bordeaux Mixture, when a combination insecticide and fungicide is required.

Arsenite of lime has been proven to be a very effective insecticide. It is prepared by boiling 1 pound of white arsenic and two pounds of lime in two gallons of water for 40 minutes, and when required for use 1 quart to a barrel of water. As white arsenic is cheaper than Paris Green this preparation is to be preferred to the latter.

The Kedzie Mixture or *Arsenite of soda*, known for some years, is even a better mixture than the arsenite of lime. It is prepared by boiling 1 pound of white arsenic, 4 pounds of sal soda in two gallons of water for 15 minutes, until a clear solution is obtained. When required for use take 1½ quarts of this solution, 4 pounds of freshly slaked lime and add to a barrel of water. It can also be used with Bordeaux Mixture.

Another arsenic compound has also come rapidly into general use, viz., *arsenate of lead.* This insecticide was tried and found effective in Massachusetts a few years ago in the fight against the Gypsy Moth. The formula is:

Arsenate of soda .....4 ounces
Acetate of lead ..... 11 ounces
Water .....150 gallons.

The arsenate of soda is dissolved in 2 quarts, and the acetate of lead in 4 quarts of warm water, then added to the 150 gallons of water.

As a rule most of our insecticides are applied in the liquid form, but within the last two years dust-sprayers have been used in some orchards. The value of dust-sprays is not definitely known; some experimenters openly oppose their application on the ground that they are not nearly so effective as the liquid sprays, while other experimenters strongly advocate their use. It is possible that dust-sprays can be used to advantage in wet weather when the foliage is wet and the ground is too soft to allow the heavy liquid spray outfits to be employed.

I must not conclude this address without referring to the educational side of the work of this Society. In the first place, it is the duty of the Society to take the lead in educating the public as to the best means of combatting the insects which prey upon the products of the country. This must be done intelligently; by this I mean that in any treatment the *why* as well as the *how* should be kept in mind. Recent insect scourges have done much to educate the producers of the country; but it must be acknowledged that even in the presence of these enormous annual losses the farmers, as a body, stand apathetic. They will take action on minor matters which involve only a few hundreds of dollars, but will do nothing when thousands of dollars worth of products are involved. As a community, the farmers of Ontario require to waken up to the tremendous losses they are annually sustaining. They are making many efforts to cheapen production and to cheapen transportation, but what efforts have they made to prevent these tremendous annual losses of millions of dollars? Education is required. Surely, it is not too much to expect the farmer who has to deal with enemies which produce such a loss to acquaint himself with the habits of the pests which work him so much injury.

Many of our most prominent fruit-growers have become experimenters, and an experimenter, you know, is usually a live, wide-awake man, with great influence in his community. The members of this Society should esteem it a privilege to help along the good work of enlightening the people regarding the wonderful world of insect life. The Department of Agriculture is generous to us, and, what is better, is sympathetic. It understands the difficulties of our work, and knows how small the army of workers is. It expects, however, every member to do his duty, for it must give an account to the public of the sum placed at our disposal.

Prof. Slingerland, in a recent article in the *Cornell Countryman*, advances a powerful argument for a better diffusion of insect knowledge. He shows that "it costs the New York farmers more than twice as much to feed their insect foes as it does to pay their share of the cost of maintaining the schools for educating their children." If this is true for New York State, it is equally true for Ontario. Arguments like this one are needed to make the farmer take an interest in a matter which is vital to his welfare.

In the second place, this Society should take a leading part in the new educational movement, called Nature-study, and help to usher in the time when every child will have an acquaintance with his surroundings and take pleasure in the world of Nature which a beneficent Creator has provided; when the method of instruction in our schools will be more rational; and when the schools will send forth students equipped for their life work, prepared for complete living.

Power as well as culture should be the result of our education, for "education for culture alone tends to isolate the individual, while education for sympathy with one's environment tends to make the individual an integral part of the activities and progress of its time."

The study of insect-life we entomologists believe to be a valuable Nature Study. It is interesting; it is a practical study, that is, one which can be

carried on without much expense; and it is a study which, perhaps better than most others, gives the student a conception of the wonderful inter-relationship of organisms. Let us hasten the time ,therefore, when the teachers in our schools will be able to use the abundance of insect life about them in the education of their pupils.

After the conclusion of the President's Address, Professor H. F. Wickham, of the State University of Iowa, Iowa City, one of the Honorary Members of the Entomological Society of Ontario, gave a very interesting address, illustrated with a large number of lantern slides, made from photographs which he had taken at the various localities referred to. The following is an abstract of his address:

INSECT DISTRIBUTION IN THE GREAT BASIN CONSIDERED IN THE LIGHT OF ITS GEOLOGICAL HISTORY.

By H. F. Wickham, Iowa City, Iowa.

In the discussion of the problem of the present distribution of animals on the earth's surface, the influence of the better marked features in the geological history have been widely recognized. It is well known, for instance, that an island lying far out to sea and separated from other land areas for vast periods of time will be inhabited by an assemblage of animals quite distinct from those of other regions—and in general, it may be said that the length of time during which this island has been thus separated, and the completeness of its isolation are the principal determining factors in the development of a peculiar fauna. Temperature, climate, chemical nature of soil and water, together with numberless other physical conditions, all conspire to work on organisms with the result of constant, though often slow change—until in the course of numberless generations the members of the isolated colony present an assemblage of characters quite different from those possessed by their relatives elsewhere. The occurrence of beetles on the high peaks of the Rocky Mountains, and on the summits of Mounts Washington and Katahdin, whose nearest allies are characteristic of the cold plains of the far north, has been explained in the light of our knowledge of the great southward movement of the ice in remote times. The ancestors of these stranded insects fled to the south in front of the advance of the tremendous glaciers. When these finally melted, their borders, retreating northward, were followed by the beetles which flourished in the cool climate of the edge of the ice-sheet; but some of the indivdiuals sought to escape the ever increasing heat by ascending the mountains. Where these were high enough to furnish proper climatic conditions for the colony thus formed, communities have been carried through to the present day, and the collector may find on the summit of the highest Rockies the identical species that he catches on the frozen shores of Labrador, though the intervening valleys of the United States and southern Canada will not furnish him a single specimen.

Another well known characteristic of insect life, is the tendency of successful species—those which are in such perfect harmony with their surroundings that the increase in number is very rapid—to spread, and to invade new territory. Where this spread is natural, that is to say, not dependent on human agency, it usually takes place along definite lines. These lines are determined by various conditions, depending on the nature of the insect, as well as on the country which it is invading. Some are very sensitive to

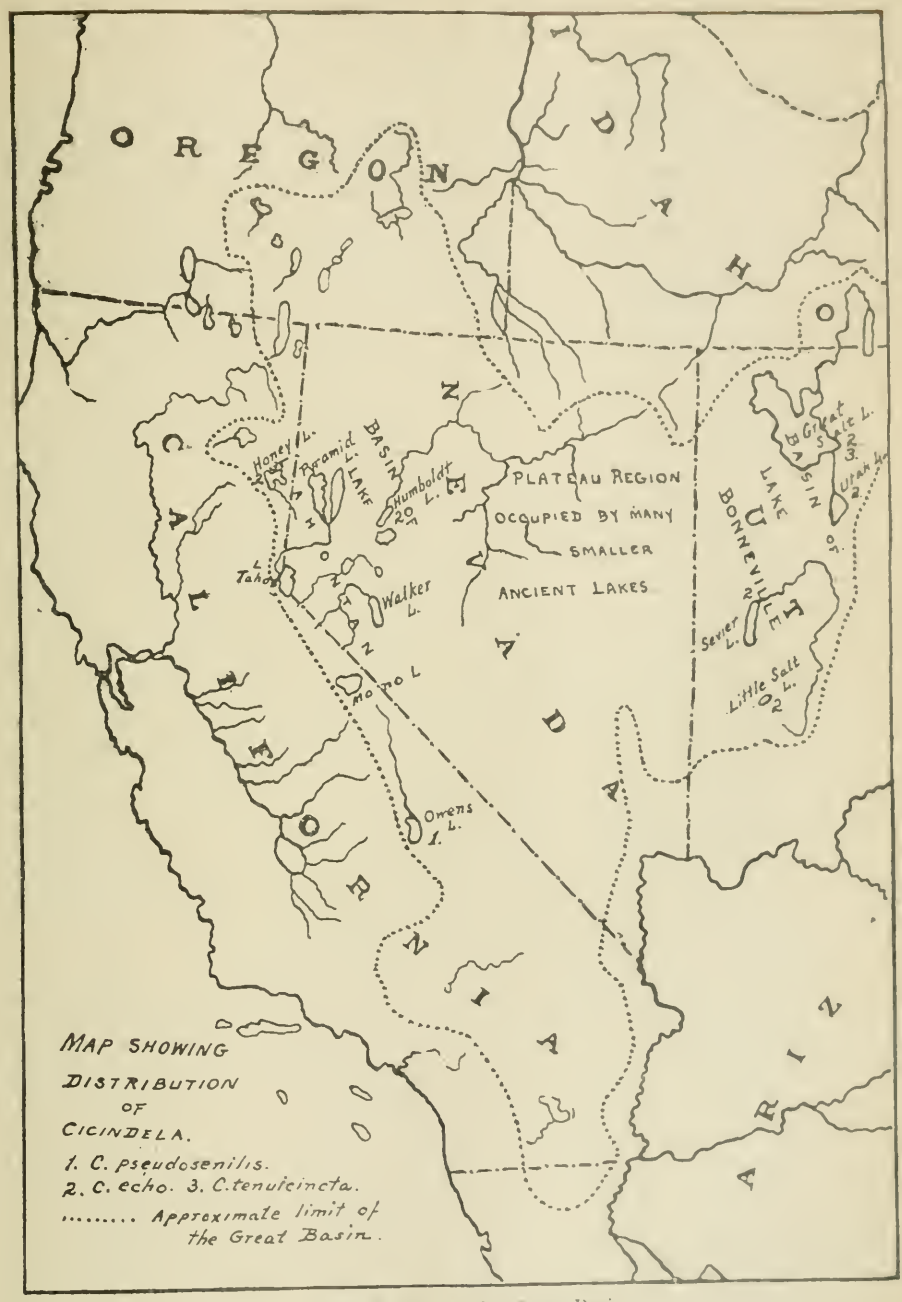


Fig. 8. Map of the Great Basin.

climatic changes, and are limited in their distribution by the isothermal lines or by the extent of rainfall. Thus, a desert may prove impassable for one species, while another may be equally unable to surmount the barrier presented by a low swampy tract, a high mountain range or a great plateau. The valley of a large river, with its gradual slope and protected nooks, forms a natural highway for the passage of migrating or spreading species.

Within the Great Basin of North America, certain problems of insect distribution are presented in almost perfect purity. In these desolate areas are spots rarely trodden by the foot of man, still supporting the life that has been theirs since the time when the valleys were filled with lakes that have left their tide-marks and old beach lines hundreds of feet up the sides of the Wasatch and the Sierra Nevada; inland seas of fresh water, gradually dwindling away as the result of widespread climatic changes, and now represented only by the few meagre salt and bitter lakes that mark the bottom of the ancient bed. Even these remnants are in danger of disappearance through the loss of their tributaries, diverted for irrigation, so that if we are to study the insects peculiar to their borders the work should not be delayed.

The Great Basin lies between the Wasatch and the Sierra Nevada. It includes the western part of Utah, nearly all of Nevada, a great part of eastern and southern California, extending a short distance down the Peninsula. It also takes in a portion of southern Oregon, and small sections of Idaho and Wyoming. Though termed the Basin, it is chiefly high plateau, fringed by still higher mountains, whose outer slopes drain into the Colorado and the Columbia, excepting along the western edge where the surplus rainfall is gathered up by the Sacremento and other rivers that discharge more directly into the Pacific Ocean. The moisture which falls within the limits of the Great Basin, however, can escape only in one way, namely by evaporation. None of the streams rising there ever break through the rim nor reach the ocean. The rivers either waste away on the vast deserts or empty their floods into shallow lakes that act as evaporating pans, precipitating the solid matters and returning the rest to the air again. As a consequence of this continual concentrating of the fluids, the waters of the lakes are nearly all strongly alkaline or saline, often so bitter as to be useless for drink. The shores are incrusted with salt and soda, sometimes the deposits are several inches in thickness. These beaches, in spite of their forbidding appearance, support a life peculiar to themselves—they are inhabited by an assemblage of insects fitted for just such conditions, and existing nowhere else.

The lakes are separated by immense tracts of desert—black volcanic rock, old hard-baked mud flats or wide valleys of sand, according to the forces that have been at work in the making of the land. Much of the valley country is in the neighborhood of five thousand feet above the sea, but it falls off to the southwest where it occasionally sinks several hundred feet below the level of the ocean. In the northern part, the climate is moderate, in the southwest it is extremely hot, but certain features are common to the district as a whole—the air is very dry and the rainfall scanty, so there is a constant, though not regular, dwindling of the water bodies. The plant life is essentially that of the desert except on the higher mountain ranges where the trees occasionally reach a profusion of growth which we may call forest.

It is, however, with the insects that we are mostly concerned, and of the insects we are best acquainted with the Coleoptera. Several types are quite characteristic of the Basin, hardly occurring outside of it, or at most barely passing the borders. In this category, may be mentioned *Cicindela echo*, a fine tiger beetle; *Cicindela tenuicincta*: *Tanarthrus salicola* and its allies, small species frequenting the borders of alkaline lakes and ponds; three hairy

Eleodes, circus bugs as they are called in the West; and a considerable number of the genus *Bembidium*, ground beetles that pick up a living on the shores of streams and pools, not dwelling at any considerable distance from moisture. Many others might be named, but I have endeavored to call attention only to a few of the more striking instances.

In studying the shore-inhabiting species just mentioned, the question has arisen, whence do they owe their origin? Are they immigrants from the surrounding lands, and if so, do they come from the north or south, the east or west? Do they have near allies on the shores of lakes lying outside of the Great Basin, or are they isolated types that may be supposed to have arisen on the ground they now occupy? My own belief, founded on several years' work with material collected on my trips to nearly every part of the Great Basin and the surrounding districts, is that they are true endemics—that they have undoubtedly arisen, as species, in their present locations or the immediate vicinity thereof. Occasionally a small colony may be established in the outlying districts adjacent to the Basin, but such cases are rare. A study of the distribution of some of the principal types, will, in my mind, cast a good deal of light on the question as to whether or not these beetles are recent acquisitions to the Basin fauna. It is unnecessary to enter into details here, as I have gone over the matter with more minuteness in a paper now in press.

Taking as an example, one of the tiger beetles, *Cicindela echo* Casey, we find it distributed as follows,—on the mud beaches of Great Salt Lake, Utah Lake, Sevier Lake and Little Salt Lake, in Utah; at Humbolt Lake, in Nevada; and at Honey Lake in eastern California. All these points lie within the Great Basin, and the beetle is entirely unknown from any other localities, though it has a close relative, *Cicindela pseudosenilis*, at Owens' Lake, also within the Basin. All these lakes are now separated by miles of burning desert, forming a barrier that completely prohibits intercourse between the different colonies. The breeding of the species on these deserts is equally impossible, since a certain amount of moisture, the year round, is necessary for its growth.

How are we to explain such a distribution? Why do we find colonies, evidently arising from the same stock, though the members of one differ more or less from those of another, scattered in these widely separated localities, when it is perfectly evident that conditions are such that passage from one lake to another is out of the question? My reply is, we must look to the ancient history of the region—to its geological record—for our answer.

Even the earliest explorers of the Great Basin noticed that the terraces on the mountains near Great Salt Lake indicated the former existence of a much larger body of water on the same site. The geologists of the United States Geological Survey have completed a study of the evidence, and have mapped the boundaries of the great lakes that are now known to have occupied the valleys during the Pleistocene periods. Their maps show the existence of two principal water bodies, one to the eastward, which has received the name Lake Bonneville, and one to the westward, known as Lake Lahontan. Between them was a plateau, dotted with smaller lakes.

With the passage of the ages, there came about a great diminution of the rainfall, and a consequent shrinkage of the great lakes of the Basin. Then came a period of humidity and a second rise of the waters, followed by a time of drought even more complete. The lakes, as a result, lost greatly in volume, bays became detached from the main bodies, forming separate independent lakes, each in its own restricted basin. Some of these, in their turn, dried up altogether, others persisted, though often, perhaps, only as small

pools, fed by perennial springs—a condition exemplified to-day on the Sevier and Humboldt flats. These are practically extinct as lakes, since they contain water only in the winter or after heavy floods, and the shore beetles have been forced to gather about the few small springs that moisten the ground along the borders.

My proposed explanation, correlating the briefly outlined geological history with the facts offered as to the distribution of the insects, may be summarized as follows: —

1. The shore beetles under consideration are confined to the Great Basin or its immediate borders, and have, in general, no allies in other districts from which they could have been recently developed. This in itself is strong presumptive evidence that they are endemic, not immigrants.

2. Within the Basin, recent conditions are such that the present distribution cannot possibly be a matter of modern origin. The small lakes now remaining in the Basin are separated by great tracts of arid desert, impassable to beetles depending on a moist soil for their development and food supply. The nature of these insects is such that they cannot be carried long distances, as eggs or larvæ, on the feet of birds or other animals.

3. Ancient conditions, as shown by the geological history through the Pleistocene, were favorable to the diffusion of shore-loving insects through the Basin, because of the much greater extension of the lakes in those times.

4. The insect most thoroughly studied, *Cicindela echo*, is entirely confined, in its present range, to the neighborhood of lakes, which from their size and the presence of nearby springs, may be presumed to have lasted in some form from a remote period—even through times of severe drought. Other littoral forms follow the same general law, though some of them are less sensitive to local conditions.

From these facts, I think we can come to but one conclusion—the beetles under consideration are types that have inhabited the Basin during the Pleistocene times when the shores of the great lakes stretched over hundreds of miles of what are now desert sands. As the lakes shrunk during times of drought, the insects followed the retreating beaches. Those which attached themselves to bodies of sufficient size or permanence were able to sustain their specific existence, while such as were dwelling on the edges of pools of a transient nature were exterminated altogether. Thus we have the phenomenon of discontinuous distribution, presented not by one species alone but by an entire assemblage.

The Chairman, Dr. Fletcher, expressed in happy terms the thanks of the audience to Prof. Wickham, for his interesting address and his kindness in travelling so far to attend the annual meeting of the Society.

SECOND DAY'S SESSION.

The Entomological Society resumed its meetings at 10.30 o'clock, a.m., the President, Prof. Lochhead, occupying the chair. The first order of business was the election of officers for the year 1904-5, which resulted as shewn on page two.

Dr. Fletcher moved, seconded by Mr. G. E. Fisher, "that popular articles should be published in the *Canadian Entomologist* next year, at least two pages per month, or more at the discretion of the Editor." After some remarks by the mover and seconder and also by the Editor in support of the resolution, it was unanimously adopted.

Dr. Fletcher moved, seconded by Mr. J.D. Evans, "that a special vote of thanks be given to the Library and Rooms Committee for the work they have undertaken and so successfully carried out in moving the Society's library, collections and other property into their new room."—*Carried unanimously.*

On motion of Dr. Bethune, seconded by Dr. Fletcher, Dr William H. Ashmead, of the United States National Museum at Washington, author of many works on Hymenoptera, and a regular contributor to the *Canadian Entomologist*, was elected an Honorary Member of the Society.

During the last forty years the Society has only elected 21 Honorary Members, of whom eleven are still living.

The next order of business was the reading of papers, which occupied the rest of the morning and the session in the afternoon; among those read were two, which have since been published in the *Canadian Entomologist* as they were of a somewhat technical character, viz.: "The systematic position ot the Ægialitidæ" by Prof. Wickham and "Further notes on types in the British Museum," by Mr. Lyman. Both these papers were illustrated with specimens of the insects referred to.

The following exhibits were shown by those attending the meeting: By Dr. James Fletcher: A box containing specimens of about twenty species of Canadian *Xylinas*, illustrating his remarks upon the genus; also *Dimorpliopteryx pinguis* and the Negundo Twig-borer *Proteopteryx Willingana*, two new and interesting species; *Syngrapha ignea*, *Autographa flagellum*, a co-type of *Autographa rubidus*, and *Panchlora viridis* taken at Winnipeg the first record in Canada.

By Mr. T. N. Willing: Several boxes of Lepidoptera, Coleoptera, etc., collected in the Northwest Territories.

By Mr. Arthur Gibson: A collection of about twenty inflated larvæ, and a box of lepidoptera bred at Ottawa, among which were specimens of *Apantesis superba*, *Papaipema purpurifascia*, etc. Also some American Beauty Rose from a conservatory in Toronto which were badly affected by a Thrips. It attacked the buds on the outside and thus spoiled the bloom. Fumigation with tobacco was found to control it satisfactorily.

By Mr. H. H. Lyman: A number of species of *Gortyna (Hydraecia)*, both moths and inflated larvæ, among which was a new species not yet described. Also some *Lepidoptera* collected in Italy and other European countries.

By Mr. C. H. Young: A collection of Micro-Lepidoptera, containing about three hundred specimens of these exquisite moths, all most beautifully and perfectly mounted.

By Mr. J. D. Evans: A number of specimens collected at light in illustration of his paper.

By Mr. J. B. Williams: Specimens of Lepidoptera taken in the neighbourhood of Toronto.

By Prof. Wickham: Dissected specimens of *Ægialites* and allied genera, showing the structure of the under-side of the prothorax, in illustration of his paper.

By Mr. C. E. Grant: A box containing over seventy specimens of moths collected at Orillia.

By Mr. J. W. Cockle: A number of specimens of cocoons of *Telea polyphemus* shewing a great variety of spinning methods, in illustration of his paper.

In connection with the exhibits, Dr. Fletcher read an extract from a letter recently received from Dr. Ottolengui of New York, which referred to certain species of Canadian Plusias. It was as follows:

Autographa rubidus, Ottol.

"I have retained the male of *rubidus* and send you one of my three females. It is in quite as good condition, and, as it was before me when I described the species, I find it has a co-type label on it. This I leave, and trust that the specimen may find its way into one of your society or national museums.

The species is an interesting one to me as I think it accounts for the reported captures of *iota* to be found in Canadian literature. I have the true *iota* from Europe, from which it differs greatly, but it is not so dissimilar from the *iota* of some of the old published lithographic plates, and as the older writers used the European names for the American fauna rather more freely than we do now, I think *rubidus* is what they all called *Iota*. I have seen in all, only seven specimens of this, three of which I have. All came from eastern Canada except one determined for Mr. Wolley-Dod. This gives you the range, and it should be found anywhere in Canada.

You have two specimens of *flagellum*. This was long called *monodon*, until Prof. Smith discovered both types in the British Museum, and correctly announced in his Bulletin of the Noctuidæ, that both types referred to one species, thus giving *flagellum* antecedence. Nevertheless subsequently he renamed the species *insolita*, which of course falls. My specimens have been compared with all true types.

A word about *fratella*, a name which I notice in turning the pages of the Catalogue before me. I omitted this from my list, as a synoym of *ou*. Just before his death Mr. Grote sent a note to the *Canadian Entomologist* denying this synonomy. The same denial is to be found on the same authority in Smith's Catalogue; Morrison having declared *fratella* to be *ou*. By closely reading the paragraph referring to *ou* in the same work we find that though it is stated that the *ou* of the Grote collection agrees with Guenée's type in the British Museum, nevertheless we are told that *Californica* is a form of *ou* rather than of *gamma*. As a matter of fact, *Californica* is quite easily separated from *ou*, but is not so distinct from European *gamma*.

Sir George Hampson kindly made comparison of my material for me and selected a brilliantly marked large specimen as agreeing with the type of *ou*, and a very small dull colored specimen from Texas, he says "agrees with types of *ou* and *fratella*. Both identical." I should add that I sent all my material to Sir George Hampson without labels other than numbers, my labels being kept at home on pins similarly numbered. He was therefore not influenced by my views. As this comparison was made long after Mr. Grote had parted with his type, and as he gives no distinguishing characteristic in his description, by all rules *fratella* must pass into the synonomy.

Oxygramma is usually considered a southern species, but I already have it from London, Ontario, through Dr. Bethune."

At the close of the meeting votes of thanks were unanimously adopted to Principal Merchant for his kindness in allowing the Society to use the Lecture-room at the Normal School, and the lantern for their public meeting on Wednesday night; to Mr. S. B. McCready, for so satisfactorily manipulating the lantern and slides; and to Prof. Wickham and Mr. Willing, for coming such long distances to read papers and take part in the proceedings of the annual meeting.

INSECTS INJURIOUS TO ONTARIO CROPS IN 1904.

By Dr. James Fletcher, Dominion Entomologist.

The season of 1904 was very similar to that of 1903 being irregular and on the whole unmarked by serious attack by insects upon our staple crops. The systematic entomologist has seldom seen such a poor collecting year, and with few exceptions outbreaks by injurious crop enemies were few. There were, as usual, local occurrences of cutworms, plum curculio, asparagus beetles, root maggots, etc., but most of the regular pests of the farm and garden were absent. No new insect enemies of importance were recorded during the past year. Loss from the ravages of the San Jose Scale was considerable in the small corner of the Province infested by that insect; but careful spraying was invariably followed by good results.

Cereal Crops.

Cereal crops throughout the province suffered little from insect enemies. There was very little injury by Hessian Fly, although Prof. Lochhead received complaints from Wentworth and Halton Counties. On the whole the wheat crop suffered much less than it has done in recent years from Hessian Fly and other Insects. Perhaps the worst injury to wheat was from rust. Oats were a fine crop, both yield and quality being above the average.

The Pea Weevil has been scarcer this year than for a great many years. Owing to the excessive ravages of this insect, many farmers during the past two or three years had almost given up growing this important crop, but the yield of 1904 and the general quality of the grain reaped will do much to restore confidence in peas as a paying crop, and a much larger acreage of this pulse may be looked for next year. It is surely of the greatest importance for all members of our Society to use every endeavor to persuade farmers to take the utmost care to sow no seed peas next spring, unless they are certain that they have been fumigated to destroy any chance weevils they might contain. As with every other frequently occurring injurious insect, the best work can be done by applying remedies even more assiduously than usual in those years when the enemy is present in the smallest numbers, and the present time seems opportune for us to continue vigorously our campaign against the Pea Weevil which was begun two years ago, and which has certainly had much to do with the present satisfactory diminution in injury by the Pea Weevil. It will be remembered that the remedies for the Pea Weevil are: 1. Sowing early so as to hurry on maturity as much as possible. 2. Reaping directly the crop is in a fit condition and threshing and fumigating with bisulphide of carbon at once, the seed to be then bagged up and kept in bags until required for use. As a general precaution no seed peas should ever be used while the Pea Weevil is abundant which are not known to have been treated, and buyers should always demand from their seedsmen such seed. There are several other methods of treating weevilly peas, besides fumigating, one of the most convenient being to sprinkle a little coal oil or turpentine over the seed and turning it well for two or three days before sowing. Another effective method is to hold over the seed in tight bags until the second year. The weevils always emerge the first spring after maturing and as they cannot perforate the sacks, they will die many months before the bags need be opened to use the grain.

placing a small quantity between the plants or along the edge of an infested crop by scattering it broadcast or running a drill of it close to a crop by means of a seed drill, or similar implement. There are other remedies which may be used for cutworms with good effect. A collar of paper or a ring of tin put around the stem at the time of planting will prevent the destruction of many plants, and a wise precaution is to destroy by burning the haulms and stems of all plants from which the crops have been reaped. This should be done as soon as the crop is picked so as to leave the land available for other crops and to remove many insects and fungi which might harm a future crop. The moths of many cutworms lay their eggs in autumn, and for this reason land should be kept scrupulously clean of all weeds and useless vegetation in autumn, as these would be an attraction to the female moths when seeking suitable places for laying their eggs, at the same time many weed seeds would be prevented from maturing.

The Beet-leaf Miner (*Pegomyia bicolor*, Wied.) appeared in several places, more particularly in Western Ontario. This caused some alarm lest it should injure the sugar-beet crop, which is now receiving much attention. These fears fortunately appeared to be unfounded, and in late summer all appearance of the attack had disappeared. The injury consists of large blotch mines which are formed in the tissues of the leaves by the maggots of a small fly. Occasionally these are so abundant that the greater part of the leaf is involved and the roots do not form properly. I know of no practical remedy, but fortunately the injury is seldom so severe as to affect the crop, the chief growth of which takes place in summer and and autumn.

Fig. 10. Cabbage caterpillar, *a* ; chrysalis, *b*.

The Green Cabbage Caterpillar (*Pieris rapæ*, L.). Although present to some extent, this destructive enemy of the cabbage was noticeably less abundant than usual last season and was easily controlled. The best remedy is to dust the plants as soon as the eaten leaves show the presence of the caterpillars, with a mixture consisting of one pound of insect powder in four pounds of cheap flour. This powder falling on the caterpillars or diluted and washed down to them by dew or rain, kills every one of them it comes in contact with, in a few hours. The practice of using Paris green in any form on cabbages, is much to be condemned. Insect powder, known also as Dalmatian, Persian and Pyrethrum Insect powder, is a vegetable poison made by pulverizing the flowers and buds of certain species of plants allied to the Chrysanthemum, and, although so very fatal in its effects upon most insects, is almost harmless to the higher animals.

The Carrot Rust Fly (*Psila rosæ*, Fab.). The maggots of this insect bore into the carrots giving them a rusty appearance on the outside and producing brown discoloured channels which run in all directions through the roots. The attack was not so severe last season as has sometimes been the case of late years. The worst injuries were in the Maritime provinces, but there were also one or two occurrences reported in Ontario, as at Ottawa, Perth, and even as far west as Barrie, which as far as I know is the furthest point west, where the insect has occurred.

Fruits.

Fruit crops were little injured by the well known and usual pests. The apple crop was large and where properly sprayed was of excellent quality. Plums were the chief failure and the injuries of the Plum Curculio upon the light crop were serious. This insect also turned its attention in many places to the apple crop, and gnarled and spotted fruit from this cause was sent in from many places. Regular spraying with poisoned Bordeaux mixture, reduced the injury to a considerable extent and orchards which were cultivated and kept free from undergrowth during the autumn seemed to be less attacked than where sod or even cover crops were on the land.

The San José Scale (*Aspidiotus perniciosus*, Comst.) still exists as a very injurious pest of the orchard in that small part of the Province where it exists, and where it has done much harm for the last six or seven years. There is now no doubt that the lime and sulphur wash as worked out by Mr. George E. Fisher, and other experimenters is a practical remedy for the San José Scale, and where persistent spraying is practised, clean paying crops can be grown, and the trees preserved in a healthy state for future crops. The necessity of persistent work, however, must be expected with this insect. The matter is now in the hands of the fruitgrowers themselves and it is well understood by all who will read and observe for themselves that even in infested districts, paying crops of apples, peaches, plums and pears, can be grown if the recommended measures are carried out. There are several methods of preparing the lime and sulphur wash, the more important of which have all been described from time to time in our annual reports. The chief difference in their preparation consists in the time it is deemed necessary to boil the washes. Mr. Geo. E. Fisher, who certainly has had as much experience in this matter as any living man, claims that there should be in every gallon of wash, half a pound of sulphur and one pound of lime, which must be boiled together for not less than two hours. The usual practice however among fruit growers, who used this wash to a large extent in 1904, in the Grimsby, St. Catharines and Niagara districts, I found was to boil the wash for about one hour only. Excellent results were obtained, which, however, might possibly have been improved by longer boiling. The new methods of combining the sulphur with the lime by means of the heat of the latter while slaking and the addition of either caustic soda or sal soda, up to the present seem to be giving very satisfactory results not only in our own experiments but in careful investigations which have been carried on by Prof. Felt in New York. Further study will be given to the matter and if an effective wash can be made in this way without the long boiling, it certainly will be a means of inducing many to do so, who at the present time do not use this useful remedy.

The range of usefulness of this wash as an insecticide and fungicide is wider than that of many other materials. Experiments in destroying the eggs of Apple Aphis and of the aphid which is so destructive to the appear-

ance of the High-bush Cranberry (or Guelder Rose, also called Snowball tree), distorting and curling up the leaves, were extremely satisfactory at Ottawa. The latter insect is so prevalent that it is a rare thing to see a tree which instead of being an ornament is not a disgusting mass of distorted leaves, swarming with plant lice. Bushes sprayed with the lime and sulphur wash, just before the buds burst, were perfectly clean, with only a few distorted leaves on the tips of some of the top twigs which evidently had been missed when the bushes were sprayed. The fungicidal value of this wash was also plainly manifest on apple trees, which were sprayed for the destruction of the eggs of the apple aphis.

The common Oyster Shell Scale, which all through Canada every year does so much harm is easily controlled by means of the lime and sulphur wash. This wash is for winter use only, as it is destructive to all kinds of foliage.

The New York Plum Scale (*Lecanium cerasifex*, Fitch). This soft scale was seen in several places in the Niagara district but does not seem to have done very much harm. Its habits are different from those of the two scales mentioned above. The San Jose Scale passes the winter as a half-grown scale attached to the bark, with its delicate threadlike beak sunk into the tissues of the wood, whence it can never withdraw them. The New York Plum scale, on the other hand, migrates in the autumn to the twigs where the young and very small scale insects cluster together and pass the winter. In the spring they again move and take up suitable places for growth upon the young and forming wood. Here they grow rapidly during May, and in the following month the females produce eggs beneath the scales from which about mid-summer the young bark-lice emerge and distribute themselves over the trees. The Oyster-shell and Scurfy scales on the other hand pass the winter as eggs beneath the protecting scales of the dead females. These different habits should be borne in mind when a remedy is being adopted. The San Jose Scale breeds continuously during the summer and up to frost, producing an incredible number of young. It is this enormous ratio of production, and the long period during which young are continuously brought forth, which renders this insect such a serious pest. The three other scales mentioned have only one brood of young in the year.

The New York Plum Scale is best treated by spraying the trees, upon which it occurs, early in spring before the buds burst, with a strong kerosene emulsion dilution, a whale-oil soap solution, or with the lime and sulphur wash. If trees are found to be infested after the leaves have opened, the kerosene emulsion or whale-oil soap solution may be used advantageously. When the scales are large and swollen, and this is the time they are generally noticed, they are capable of doing very little harm. It is better therefore to wait until the young insects leave the scales and are noticed crawling about on the trees. Spraying at that time will destroy large numbers without any fear of injuring the trees.

A noticeable feature of the past season has been the small amount of injury attributable to many of the well known destructive enemies of the orchard and garden. The Codling Moth, which is every year the cause of serious loss in the apple crop, did remarkably small injury and hardly occurred at all in those sections of the province east of Toronto where there appears to be only one brood. West of that point the first brood was little noticed, but the second brood in some places was the cause of some loss. The remedies for the Codling moth are a combination of spraying in spring and banding the trees with burlap in late summer. With regard to this latter method it must be pointed out that unless the burlap bands are taken off regularly and either

scalded or crushed between rollers, more harm than good may be done by these bands being placed on the trees. Another point also which will require attention is to see that the bark of the trees beneath the bands is scraped with a wire brush, or other hard instrument, to destroy the cocoons of such caterpillars as have partially bored into the bark to pupate. These are extremely difficult to see unless carefully looked for.

The Squash Bug (*Anasa tristis*, DeG.). Another troublesome enemy of the fruit grower and gardener which this year was less destructive than has for many years been the case, was the large so-called "stinkbug" or "Bishop bug" of western Ontario.

Tent Caterpillars which some years ago stripped many orchards and tracts of forest land were only noticed in a few districts in south-western Ontario, and they were so thoroughly destroyed by parasites two years ago that not a moth or caterpillar of either of the common species was seen at Ottawa during the past year. There is no doubt that they will soon reappear again; but, with ordinary case, no well kept orchard will ever suffer seriously from these insects. Regular annual spraying will prevent injury by Tent Caterpillars, Cankerworms, Eye-spotted Bud moth, leaf rollers, and all the ordinary foliage-eating pests of the orchard. If spraying is supplemented with the washing of the trunks in the beginning of June and July, with alkaline washes, most of the different kinds of borers which attack apple trees, will be kept at bay. For the Peach Borer, special steps will have to be taken and for the small Shot-borers and Bark Beetles, carbolic washes must be applied early in spring. If besides these precautions proper attention is given to the fertilization of the soil and the pruning of the trees so as to allow a free action of sun and wind, there will be little harm from injurious insects and fungous diseases. There is nothing so manifest to the practical entomologist as the fact that vigorous, well-cared for trees, are far less attractive to their insect enemies than those trees which are stunted or in some other way injured.

House Plants.

The insects which do injury in window gardens and upon house plants generally, are few in number and may be treated in a wholesale manner. For the satisfactory cultivation of house plants one of the prime principles is to grow only such number of plants in a window as can be properly attended to, and as can obtain a suitable amount of light, air and space for their symetrical development. The number of insects which attack house plants is small and the same treatment answers for most of them. There is a great deal of trouble saved by choosing such plants as are seldom infested by insects. To this class belong the different kinds of Geraniums, on the whole, perhaps, the most valuable and satisfactory plants for house culture. They are easily propagated, very resistant of neglect and most profuse bloomers. Fuchsias, begonias and bulbs of various kinds are seldom attacked by insect pests. On the other hand, palms, cacti, foliage plants and ferns are liable to be much infested by different kinds of scale insects, *Thripidæ* and the so-called Red Spiders; roses, by scale insects and plant lice. The first principle of window gardening is to give the plants suitable soil, pots large enough but not too large, and good drainage with regular watering. The insects as stated above may be easily controlled on general principles. The first of these is to wash the foliage regularly to free it from dust and scale insects; spraying plants of almost all kinds is very beneficial to them. Palms and thick-leaved plants like the oleander, may be washed with a piece of soft flan-

nel or a sponge, drawing the leaves one by one through a fold of the flannel. For this purpose any soap will answer, but tar soap is the best. There is also a special tobacco soap which is made for this purpose. When a plant is received and is found to be thoroughly infested by scale insects it is well to make a small quantity of kerosene emulsion and this may be done easily in an ordinary quart bottle, placing the ingredients in it and shaking it violently by hand. After treating a plant, either with strong soap suds or kerosene emulsion, it is well to let it stand for a short time, from half an hour to an hour, and then wash off the soap. When spraying or washing large plants they may be stood in a bath or other large receptacle. When roses or other plants are infested by plant lice, many of these may be dislodged by simply puffing pyrethrum insect powder on to the colonies. This will cause many of them to drop, but will not kill them and unless they are swept up and destroyed they will crawl back again on to the plants. For thoroughly cleaning the plants both of the insects and of the honeydew produced by them, a washing with soap suds or kerosene emulsion will be necessary. When a prickly cactus is found to be infested with woolly aphis or other scale insects, perhaps, the easiest treatment is to touch the separate insects with a small paint brush dipped in alcohol. "Red Spiders," which are among the most troublesome pests of the window gardener, are reduced in numbers by keeping the plants as cool and damp as possible, but more than this is necessary, and the sovereign remedy for these and all kinds of mites, is to dust them frequently with flowers of sulphur. This material in no way injures the plants but renders them very distasteful to the spinning mites which as a class are known by the name of Red Spiders.

ENTOMOLOGICAL RECORD, 1904.

By James Fletcher, Dominion Entomologist, Ottawa.

The season of 1903 was cool and disappointing, but that of 1904 was even more so. Collectors from every part of the Dominion make complaints of the small number of days which could be called good collecting days. In my own experience of thirty years in Canada I have never known a season when insects were so scarce, and this character extended from the Atlantic to the Pacific. I have been pleased to note the stimulating effect of the publication of the Entomological Record among all classes of collectors; but as compiler I must still urge collectors to read this Record carefully and make the fullest use of the many opportunities for advancing their studies thereby afforded. In preparing the lists herewith submitted, I have received much assistance from collectors who have sent in much more regularly than heretofore, records of their captures. Special lists have also helped very much by giving critical notes when identifying specimens. Valuable reports of a more extended nature, given herewith, have been received from Mr. W. D. Kearfott on Micro-lepidoptera, from the Rev. G. W. Taylor, on Geometridæ, and from Mr. E. D. Harris, on Cincindelidæ These reports are of special value, and the writers have most generously offered their services to any of our collectors who will correspond with them.

Other specialists, who, as in the past, have done good service for Canadian entomology, have this year again put us under deep obligations for expert assistance. Dr. Howard, the Chief of the Bureau of Entomology, at Washington, as well as Messrs. Dyar, Coquillet and Ashmead, of Washing-

ton; Dr. J. B. Smith, of New Brunswick, N.J.; Mr. W. Beutenmueller, of New York; Dr. Henry Skinner, of Philadelphia; Mr. E. P. Vanduzee, of Buffalo; Prof. H. F. Wickham, of Iowa City, Iowa; Prof. J. S. Hine, of Columbus, Ohio, and Mr. W. H. Harrington, of Ottawa, Ont.; have examined and named numerous collections during the past year, and, although the thanks of the individual collectors have been expressed to them, I take pleasure in publicly acknowledging here their help to the general cause of Canadian entomology.

Collections of insects have been made in various parts of Canada this year by visitors, perhaps the most important of these being by Mrs. Nicholl, of Merthyr Mawr, Bridgend, South Wales, who spent the summer in the Rocky Mountains and made extensive collections. Possibly the most interesting result of Mrs. Nicholl's work was the discovery of *Erebia Vidleri* in considerable numbers in the Okanagan valley. The original locality where the types were collected by Mr. Vidler, thirty years ago is somewhat in doubt. Nothing had been seen or heard of the species after it was first taken, until in 1898, when I rediscovered it on Mount Chéam near the mouth of the Fraser River in British Columbia. Mrs. Nicholl also took during the summer several specimens of that Rocky Mountain Greyhound, *Brenthis astarte*, and many other rarities seldom seen in Canadian collections.

Mr. C. W. Leng, of New York, tells me that Mr. W. S. Genung spent three months this year, collecting beetles in Nova Scotia, Cape Breton and Newfoundland, and sent him 11,000 specimens containing some great rarities.

A few small collections were brought back by the officers of the Geological Survey of Canada, but a great deal more good work might be done by these gentlemen, with their exceptional opportunities, in adding to the large collection of insects already in the museum of that Department. Specimens from any little visited locality are of great scientific value if the date of collection and exact locality are noted—even a single specimen may be of the greatest interest. A few specimens well preserved are of far more value than a large number in poor condition or without data. Mr. Jos. Keele secured some specimens of special interest in the valley of the Mayo River, Yukon Territory. Mr. E. R. Faribault collected in Nova Scotia, and Mr. Andrew Halkett, who was the naturalist on the "Neptune" in her explorations under Mr. A. P. Low, in Hudson Bay in 1903-04, brought back some very interesting specimens.

Literature.

Among the works which have dealt with Canadian insects and which have appeared during the past year, mention may be made of the following:

Dyar, Harrison G. Lepidoptera of the Kootenai District of British Columbia, Proc. U. S. Nat. Museum, vol. XXVII., pp. 779-938. — One of the most important publications of 1904 for Canadian entomologists is Dr. Dyar's annotated list of the lepidoptera taken by him and Messrs. Currie and Caudell during a three months' visit to Kaslo on Kootenai Lake in the summer of 1903. This list also includes mention of the species found in the rich local collection of Mr. J. W. Cockle. The great value of this list will be found in the critical and comparative notes on the species mentioned, with their near allies. 653 species are mentioned, with more or less complete larval notes of 167. There have been many collectors in the Rocky

Mountains of Alberta and British Columbia, and this report will be invaluable in working up their captures, enriched as it is by Dr. Dyar's experience and great knowledge of the forms occurring in the adjacent western States of the Union. Naturally many species were added to the list of Canadian Insects, and many indefinite western forms after careful study were given varietal or specific rank and described. By the publication of Dr. Dyar's list several doubtful cases of identification are cleared up and future students of western mountain lepidoptera will have a firm basis for their studies.

Smith, J. B. Common Mosquitoes of New Jersey, Bull. 171, N. J. Agric. Ex. Stn.—A pamphlet of 40 pages well illustrated and the matter chiefly original, conveniently arranged in Dr. Smith's usual thorough and practical manner. It will be found very useful to those taking up the study for the first time, and also by the advanced student on account of the new matter relating to life histories.

Felt, E. P. Mosquitoes or Culicidae of New York State, N.Y. State Museum Bull. 79, pp. 165, 57 plates, 113 wood cuts.—This is a sumptuous bulletin beautifully printed and profusely illustrated. The literature dealing with mosquitoes is now very extensive, and this paper will be found one of the most valuable of those dealing with this now popular study. The subject is very fully dealt with, and many species are treated at length. A valuable bibliography mentions all the important publications from 1847 down to the present time, 130 in number. As an appendix of six pages is a generic revision of the Culicidæ. The whole is completely and carefully indexed, a most satisfactory character of all the publications by Dr. Felt and his predecessor, Dr. Lintner.

Swezey, Otto H. A Preliminary Catalogue of the Described Species of the Family Fulgoridæ of North America, north of Mexico. Ohio Dept. Agric.; Div. Nursery and Orchard Inspection, Bull. No. 3.—This catalogue of 48 pages contains much valuable information concerning these little known homopterous insects. Not only is an attempt made to include all of the described species from North America, north of Mexico, but with each genus and species are given a full synonymy and bibliography, as well as notes regarding localities, food plants, and life histories, as far as known. The want of such a source of reference was much felt.

The Harriman Alaska Expedition, vols. VIII. and IX., Insects.—These volumes published in co-operation with the Washington Academy of Sciences are an important contribution to American entomology. The material was collected by Prof. Kincaid, of the University of the State of Washington. More than 8,000 insects were collected representing 1,001 species, 344 of which were new to science. The identifications have been made by experts through Dr. Howard at Washington. Unfortunately, the price at which these volumes are published will preclude their wide distribution amongst the students of the different orders. The style of printing, binding and illustration are of the very highest class.

Busck, August. Tineid Moths from British Columbia, with descriptions of new species. Proc. U. S. N. M., vol. XXVII., pp. 745-778.—This paper is based mainly on a large collection made in British Columbia, chiefly at Kaslo, on Kootenai Lake, in 1903, by Dr. H. G. Dyar assisted by Messrs. A. N. Caudell and R. P. Currie. There are also notes on collections received by the National Museum from the States of Washington, Oregon and Idaho. Notes of more or less length are given of 55 British Columbian species, and among these 17 are described as new.

Currie, Rolla P. An Insect Collecting Trip to British Columbia, Proc. Ent. Soc. Wash., vol. VI., p. 24.—This paper, although it does not attempt to cover all the insects noticed or studied during the visit of Messrs. Dyar, Caudell and Currie to Kaslo, B.C., gives much valuable information regarding the region, the plants and insects which were noted in the different localities in the Kootenai District visited by the above named gentlemen. It will be of special interest to anyone contemplating a visit to that interesting part of British Columbia.

Dyar, Harrison G. Notes on the Mosquitoes of British Columbia, Proc. Ent. Soc. Wash., vol. VI., p. 37.—Twenty different species of mosquitoes are noted in this article, represented by 1,238 specimens collected in 1903. Biologic notes are given of many of the species.

Beutenmueller, Wm. American Museum Journal, vol. IV., No. 4. (Reprint.) The Insect-Galls of the Vicinity of New York City.—This is a most useful pamphlet of 38 pages, and will be found of great value in the identification of many of the insect-galls about which so little is known. 87 different species of gall insects are listed and an illustration of the gall in each instance given.

Specialists.

The records received this year are again chiefly made up from the work of lepidopterists and coleopterists. Collections have been made in other orders; but the number of certain identifications is smaller than was hoped might be the case, and the recording of these, except in a few instances, does not seem to be advisable just now. On the whole decidedly more interest was shown in the study of various orders during 1904 than for many years past. Mr. R. V. Harvey, of Vancouver, has done much in encouraging the British Columbian collectors and holding them together. He has also published a list of the Butterflies of his province, which will form a basis for future work. The Rev. G. W. Taylor, has pushed forward his studies of the geometridæ and is now in correspondence with nearly all the collectors in the Dominion. It is to be hoped that before long Mr. Taylor will see his way to publish the results of his labours. Mr. J. W. Cockle at Kaslo, and Messrs. F. H. Wolley-Dod and A. F. Hudson at Millarville, Alta., have made great advance in their studies of the noctuidæ. Mr. T. N. Willing at Regina, and the Criddle brothers at Aweme, Man., have added largely to their general collections of insects. Mr. E. F. Heath, at Cartwright, in Southern Manitoba, has collected vigorously and added much to the local fauna of his province. In Montreal Messrs. H. H. Lyman, A. F. Winn and C. Stevenson have been actively at work on the life histories of lepidoptera. At Ottawa Mr. C. H. Young has made extensive collections in some of the families of the lepidoptera and has sent them to specialists, all of whom comment upon the great excellence of his mountings. In the Division of Entomology at the Central Experimental Farm the entomologists have devoted much time to working out life histories, and besides have endeavored to help and encourage students in all orders.

Active Workers.

The following list gives the names of the most active workers in Canada which have been heard from during the past year. There are doubt-

less many others, but I have not heard from them during 1904. The initials in parentheses after their names indicate the orders they are studying, or if they have general collections.

Anderson, E. M., Victoria, B. C. (L.)
Bethune, Rev. C. J. S., London, Ont. (Gen., L., C.)
Bégin, Rev. P. A., Snerbrooke, Q. (Gen.)
Baird, Thomas, High River, Alta. (Gen.)
Brainerd, Dwight, Montreal. (L.)
Bryant, Theodore, Wellington, B. C. (L.)
Burman, Rev. W. A., Winnipeg. (Gen.)
Bush, A., Vancouver, B. C. (L.)
Campbell, D. A., Ottawa. (Gen.)
Chagnon, Gus., Montreal. (C.)
Cockle, J. W., Kaslo, B. C. (L.)
Criddle, Evelyn, Aweme, Man. (L., Gen.)
Criddle, N., Aweme, Man. (L., Or., C.)
Criddle, Stewart, Aweme, Man. (L., Gen.)
Crew, R. J., Toronto. (C.)
Dennis, A. J., Beulah, Man. (L.)
Denny, Edw., Montreal. (L.)
Desrochers, Rev. J. E., Rigaud, Q. (L. C.)
Dod, F. H. Wolley, Millarville, Alta. (L.)
Draper, R., Vancouver. (L.)
Evans, J. D., Trenton, Ont. (Gen., L., C. Hym.)
Findley, Rev. G. H., Ainsworth, B. C. (L.)
Fletcher, Dr. J., Ottawa. (Gen., L., C.)
Fyles, Rev. Thos. W., Levis, Que. (Gen., L., Hym.)
Garrett, C., Calgary, Alta. (L.)
Gibbon, H., Beulah, Man. (L.)
Gibson, Arthur, Ottawa. (L., Gen.)
Grant, C. E., Orillia, Ont. (L.)
Gregson, P. B., Blackfalds, Alta. (Gen.)
Guignard, J. A., Ottawa. (Gen., Hym.)
Hanham, A. W., Victoria, B. C. (L., D., C.)
Harrington, W. H., Ottawa. (C., Hym., Hem., D.)
Harvey, R. V., Vancouver. (L., Odon.)
Heath, E. F., Cartwright, Man. (L.)
Huard, Rev. Victor. Quebec. (Gen.)
Hudson, A. F., Calgary, Alta. (L.)
Jones, W. A. Dashwood, New Westminster, B. C. (L.)
Keen, Rev. J. H., Metlakatla, B. C. (C.)
Lochhead, Prof. W., Guelph, Ont. (Gen., Or.)
Lyman, H. H., Montreal. (L.)
McIntosh, W., St. John, N. B. (L., D., C.)
McIntyre, A. D., Boisdale, Nfld. (C.)
MacLaughlin, T. J., Ottawa. (Odon.)
Marmont, L. E., Rounthwaite, Man. (L.)
Metcalfe, W., Ottawa. (L., C., Hem.)
Moore, G. A., Montreal. (Hem.)
Morden, John E., London, Ont. (L.)
Perrin, Jos., Halifax, N. S. (L.)
Norris, A. E., Montreal, (L.)
Ouellet, Rev. C. J., Montreal. (C., Hym.)
Richard, A. E., Ottawa. (L.)
Roy, Rev. Elias, Levis, Q. (C.)
Sandercock, W. C., Lauder, Man. (L.)
Saunders, H. S., Toronto. (L.)
Simpson, Willibert, Ottawa. (C.)
Suffield, J. D., Morden, Man. (L.)
Sanson, N. B., Banff, Alta. (Gen., L.)
Schmitt, Dr. J., Anticosti. (Gen.)
Southee, G. R., Outremont. (L.)
Stevenson, Charles, Montreal. (L., C., Hem.)
Tanton, J., London, Ont. (L.)
Taylor, Rev. G. W., Wellington, B. C. (L., Hem., C.)
Tipping, Dalton, Blackfalds, Alta. (Hym., Gen.)
Thompson, W. Robin, London, Ont. (L., C.)
Venables, E. P., Vernon, B. C. (L., C., Hym.)
Walker, Dr. E. M., Toronto. (Or., Odon.)
Winn, A. F., Montreal. (L.)
Wilson, E., Vancouver. (L.)
Wilson, Jno., Vancouver. (L.)
Wilson, T., Vancouver. (L.)
Wilson, W. J., Ottawa. (Gen.)
Williams, J. B., Toronto. (L.)
Willing, T. N., Regina. (L., Or., C.)
Wood, A. A., Coldstream, Ont. (L.)
Young, C. H., Hurdman's Bridge, Ont. (L.)

NOTES OF CAPTURES.

Lepidoptera.

(Arranged according to Dyar's List of North American Lepidoptera, U. S. N. M. Bull. No. 52.)

RHOPALOCERA.

(Dyar's number.)

8. *Papilio daunus*, Bdv. Regina, N.W.T., (Mrs. J. R. C. Honeyman).
16. *Papilio machaon*, L., a. *aliaska*, Scud. Quite common along the shores of Mayo Lake, and valley of Mayo River, Yukon Territory, during July and August. (J. Keele).
28. *Neophasia menapia*, Felder. 1904 was a "menapia year"—millions these butterflies could be seen around the Douglas firs and on the sea between Vancouver Island and the mainland in August last.
Pontia brassicæ, L. Two larvæ of this well-known European species, the "Large White," taken on Nasturtium vines in Westmount, Que., Sept. 4. Both parasitised. (Winn). The larval skin was exhibited at the annual meeting, Ent. Soc. Ont., 1904, and was undoubtedly rightly named by Mr. Winn.
62. *Eurymus meadii*, Edw., a. *elis*, Strk. Just coming out near Laggan, July 20, (Mrs. Nicholl).
64. *Eurymus boothii*, Curtis. Mayo Valley, Yukon, (J. Keele). A female. Elwes's fig. 5. Trans. Ent. Soc. London, part III. 1903, corresponds exactly with this specimen.
73. *Eurymus pelidne*, Bdl. a. *Skinneri*, Barnes. Just coming out, near Laggan, B.C., July 19, (Dod).
75. *Eurymus nastes*, Bdv. Not rare above timber line on several mountains near Laggan and Field, B.C., July 20 and onwards, (Mrs. Nicholl and Mr. Dod).
85. *Eureme euterpe*, Men., (*lisa*, Bdv.). Halifax, Aug. 24, (Perrin).
143. *Brenthis Alberta*, Edw. On several mountains near Laggan, near the summits. Less of a peak-lover than *astarte*, much more local and less common, but not nearly so difficult to capture. Both sexes were taken in about equal numbers. Mrs. Nicholl who subsequently collected on many mountains between Laggan and Field reported *alberta* to be "common everywhere." July 19 and onwards, (Dod.)
144. *Brenthis astarte*, D. & H. Fairly common on several bare peaks near Laggan, July 19 and 20. The males play around the extreme summits at 8,000 ft. or over. They are very hard to net, as their flight is exceptionally swift. The females were met with, but very rarely, much lower down, almost or quite at timber line (about 7,000 ft.). Mrs. Nicholl met with it almost everywhere she went in the Rockies. (Dod.)
207. *Polygonia satyrus*, Edw., High Falls, Que. July 12, (Saunders).
284. *Cœnonympha typhon*, Rott., a. *laidon*, Bork. (*ignorata*, Edw.). One damaged specimen taken at Lac Charlebois, Que., (Laurentian Mts.), July 21. Several seen from train window in same district June 4, (Winn).
286. *Enodia portlandia*, Fab. Scotch Lake, N.B., July 9, (W. H. Moore). This is a new record for New Brunswick.

295. *Œneis norna*, Thun., l. *Beanii*, Elwes. Very common on several bare peaks near Laggan, over 8,000 ft. July 19 and 20. Mrs. Nicholl found it common everywhere (on peaks) round Laggan, Field and Banff. (Dod.)

308. *Anosia plexippus*, L. One specimen in fresh condition, Vernon, B. C., Aug. 13. A rare visitor here, (Venables).

Thecla Johnsoni, Skinner. Ent. News, XV., 298. North Vancouver, May 22, (Bush).

384. *Strymon titus*, Fab. Three specimens at Vernon, B. C., Aug. 15 and 16, (Harvey & Draper).

401. *Chalceria Snowi*, Edw. Fairly common on several mountains near Laggan, July 18-20, above timber, also on Mt. Assiniboine, 30 miles south of Banff, (Dod).

430. *Rusticus Shasta*, Edw., Red Deer River, 50 miles N.E. of Gleichen, July 5-9, very local, (Dod).

463. *Amblyscirtes samoset*, Scud. MacNab's Island, Halifax, (Perrin). Rather abundant along a railroad track, Chelsea, Que., May 28, (Gibson & Campbell).

469. *Pamphila palæmon*, Pallas, (*mandan*, Edw.). MacNab's Island, Halifax, (Perrin).

564. *Phycanassa viator*, Edw. Coldstream, Ont., July 31, (A. A. Wood).

624. *Thanaos martialis*, Scud. Coldstream, Ont., July 31, (Wood).

625. *Thanaos juvenalis*, Fab. MacNab's Island, Halifax, (Perrin).

HETEROCERA.

657. *Lepisesia flavofasciata*, Wlk., a. *ulalume*, Strk. Vancouver. Several in May, 2 sp. May 14, (Harvey & Bush). Larva feeds on *Epilobium*, (Cockle). Wellington 14 specimens, (Taylor).

659. *Lepisesia Clarkiæ*, Bdv. Vernon, May, (Venables).

664. *Aellopos tantalus*, L. Sydney Mines, C.B., (Miss Margaret Brown). One of the most remarkable captures of the year. Dr. Bethune also took a specimen of this southern hawk moth, about ten years ago, at Port Hope, Ont. See also Can. Ent., *XXIII.*, p. 41, for note on a specimen taken at Grimsby, Ont.

681. *Ampelophaga chœrilus*, Cram. MacNab's Island, Halifax, (Perrin).

713. *Sphinx Canadensis*, Bdv. When looking over the collection of Mr. H. S. Saunders, I noticed a specimen of this rare moth, which was taken by him in Ottawa, July 7, 1899, (Gibson). Ottawa, Aug. 12, a remarkably late date, (Fletcher).

765. *Pseudohazis Shastaensis*, Behrens. Kaslo, several taken in June, (Cockle).

934. *Æmilia roseata*, Wlk. Vancouver, July 10, (J. Wilson).

981. *Apatela cretata*, Sm. Millarville, female at sugar, June 20. Always a great rarity, (Dod). Wellington, (Taylor). First record in British Columbia.

996. *Apatela Manitoba*, Sm. Cartwright, 2 at sugar, June 20, (Heath).

1,017. *Apatela parallela*, Grt. Aweme, June 18, (Criddle).

1,032. *Apatela distans*, Grt., a. *dolorosa*, Dyar. Kaslo, several at sugar (Cockle).

1,034. *Apatela perdita, Grt.* Kaslo, several at sugar, (Cockle).

Platyperigea anotha, Dyar. Kaslo, Aug. 12, (Cockle).

1,102. *Caradrina multifera*, Wlk. Wellington, new to B. C. list, (Bryant).
1,156. *Hadena adnixa*, Grt. Cartwright, at sugar, only one taken.
1,170. *Hadena tonsa*, Grt. Cartwright, one at sugar, July 25, not taken here before, (Heath).
1,186. *Hadena lona*, Strk. Cartwright, at sugar, always scarce, June 27, (Heath). A specimen received from Rev. J. H. Keen taken at the mouth of the Skeena River, B.C., July 10, and submitted to Dr. Smith, was named *runata*, Sm., which name is now a synonym of *lona*.
1,189. *Hadena Barnesii*, Sm. Aweme, July 23, (Criddle).
1,192. *Hadena mustelina*, Sm. Wellington, new to B. C. list, (Bryant).
1,216. *Hadena contradicta*, Sm. Millarville, June 27—July 9, a few at sugar. Not seen for years. (Dod.)
1,286. *Momophana Comstocki*, Grt. Vancouver, 3 specimens at light, April 30—May 3, (Harvey).
1,281. *Hyppa brunneicrista*, Sm. Millarville, June 24, at sugar. Rare, not seen for years. (Dod.)
1,290. *Dipterygia scabriuscula*, L. Cartwright, July 1, One at sugar, a record for Manitoba. (Heath.)
1,317. *Homohadena stabilis*, Sm. Regina, Aug 1, (Willing).
1,354. *Oncocnemis viriditincta*, Sm. Cartwright, one at sugar, not taken before. Recorded from Winnipeg by Hanham. (Heath.)
1,370. *Adita chionanthi*, S. & A. Cartwright, Aug. 12, several at sugar. I think I have only once before taken it. (Heath.)
1,389. *Rhynchagrotis gilvipennis*, Grt. Lac Charlebois (Laurentian Mts.), July 23, (Winn).
1,396. *Rhynchagrotis variata*, Grt. Oak Bay, Victoria. Early in Sept. at sugar. Rather a rarity here. (Hanham.)
1,419. *Platagrotis condita*, Gn. Cartwright. Two at sugar. *Condita* is always much rarer here than *pressa*, Grt. (Heath.)
Eueretagrotis inattenta, Sm. Millarville, July 2, not common, at sugar, (Dod).
1,450. *Setagrotis infimatis*, Grt. Oak Bay, Victoria, Aug. 23 to Sept. 17, at sugar, (Hanham).
1,477. *Noctua esuralis*, Grt. Meech Lake, Que., July 24, (Young).
1,492. *Noctua juncta*, Grt. Meech Lake, Que., July 4, (Young). The first specimen of this interesting species taken in the Ottawa District.
Noctua dislocata, Sm. Can. Ent., June, 1904. Millarville. A few males at sugar with *N. Calgary*, Sm. June 28—July 4. (Dod.)
1,522. *Chorizagrotis terrealis*, Sm. Millarville. One specimen June 30. A great rarity. (Hudson.)
1,548. *Feltia aneipennis*, Grt. At sugar. Kaslo, (Cockle).
1,610. *Paragrotis citricolor*, Grt. Cartwright, Sept. 16, at sugar. A great rarity; only one taken before this. (Heath.)
1,611. *Paragrotis acornis*, Sm. Cartwright. Two at sugar Aug. 19, rare, (Heath). During latter part of Sept. (Heath.)
1,682. *Paragrotis fuscigera*, Grt. Cartwright. A few at sugar during the latter part of Sept. (Heath.)
1,687. *Paragrotis ternarius*, Sm. Wellington. (Bryant). Addition to B. C. list.

1,693. *Paragrotis mollis*, Wlk. Millarville, Sept. 3, at light by Mr. Hudson. Only two specimens previously taken. (Dod.)

1,716. *Paragrotis basalis*, Grt. Cartwright, one at sugar, Aug. 2. The first time I have seen it here. (Heath.) Regina, (Willing).

1,720. *Paragrotis Idahoensis*, Grt. Wellington, (Bryant).

1,727. *Paragrotis abar*, Strk. Cartwright, one at sugar, Sept. 3. I took one last year which was named by Dr. Smith, and this agrees with it. (Heath.)

1,767. *Agrotiphila maculata*, Sm. Mts. Fairview and St. Piran, Laggan, B. C., above timber (7,500—8,500 ft.), July 19 and 20—rare, (Mrs. Nicholl and Mr. Dod).

1,806. *Mamestra rubefacta*, Morr. Millarville. June 17 at sugar, very rare, (Hudson).

1,840. *Mamestra sutrina*, Grt. Millarville, May 30, at light. Always a great rarity. (Hudson.)

1,877. *Mamestra circumvadis*, Sm. Millarville, June 30 and July 2, at light, always a great rarity, (Dod.)

Mamestra acutermina, Sm. Cartwright. At sugar with *M. Goodellii*, Grt., June 20, (Heath).

Mamestra Dodii, Sm. Can. Ent., June, 1904. Millarville, June 25. As usual, not rare at sugar, (Dod).

1,895. *Xylomiges rubrica*, Harvey. Kaslo, a splendid specimen of this very variable species, (Cockle). Vancouver, several in April, (Bush).

1,907. *Scotogramma densa*, Sm. Kaslo, one specimen, (Cockle).

1,953. *Heliothis unipuncta*, Haworth. Oak Bay, Van. Island, one at sugar, Sept. 10. The only specimen I have seen in British Columbia. (Hanham.)

1,983. *Heliophila calgariana*, Sm. Millarville, Aug. 2, at sugar. Probably a variety of *anteroclara*, Sm. (Dod.)

2,006. *Himella contrahens*, Wlk. Lac Charlebois, Laurentian Mts. several at sugar, July, (Winn).

2,026. *Graphiphora peredia*, Grt. Cartwright, July 14, at sugar. This moth is of very uncertain occurrence. (Heath.)

2,067. *Cleoceris populi*, Strk. Millarville, Alta. Bred July 28—Aug. 4, from larvæ common locally on black poplar. Began pupating about June 25. (Dod.)

2,071. *Cleoceris curvifascia*, Sm. Cartwright, at sugar, Aug. 26. Rare, (Heath).

2,072. *Aporophila yosemitæ*, Grt. Mr. Heath has shown me that the insect which I have recorded from Rounthwaite and Aweme as *Hadena relecina* is really *A. yosemitæ*. It has been taken from Manitoba to the Rocky Mountains.

2,076. *Pleroma apposita*, Sm. Victoria, on fences and at light, during March. In 1903 this species was out at the end of February. A pair taken at light early in April are very black and may prove to be another species. (Hanham.)

2,084. *Xylina torrida*, Sm. Wellington, April 4, (Bryant).

2,107. *Xylina tepida*, Grt. Cartwright. At sugar, seems to be more abundant than usual this year. Sept. 16. (Heath.)

Xylina ancilla, Sm. Nepigon, bred from larva on *Cornus stolonifera*, (Fletcher). Cartwright, (Heath).

Xylina Fletcheri, Sm. Ottawa. Among material recently sent to Dr. Smith was a specimen of a new species which was taken at Ottawa, Oct. 7, 1903, and given this name. Mr. Gibson also took a specimen on Oct. 3 of this year.

2,116. *Litholomia Dunbari*, Harvey. Wellington, B.C., (Taylor).

2,168. *Gortyna medialis*, Sm. Millarville, Alta., Sept. 6 at light, (Dod).

2,178. *Papaipema purpurifascia*, G. & R. Larvæ common at Ottawa working in the roots of *Aquilegia*, moths emerging from Aug. 18 to Sept. 13. (Gibson.)

2,180. *Papaipema nelita*, Strk. Aweme, Aug. 30, (Criddle).

2,192. *Papaipema marginidens*, Gn. Trenton, (Evans).

2,224. *Orthosia inops*, Grt. Cartwright, at sugar, Aug. 8. This is the second time that this little moth has been taken by me. (Heath.)

2,230. *Orthosia helva*, Grt. Coldstream, Ont. Aug. 23, (Wood).

2,235. *Parastichtis discivaria*, Wlk. Regina, Aug. 7, (Willing).

2,255. *Epiglæa decliva*, Grt. Cartwright. At sugar Sept. and Oct. At first by the faint light of collecting lamp, confused with *Glæa inulata;* must have seen a dozen or more. Not noticed in previous years. (Heath.)

2,259. *Calymnia orina*, Grt. Grand Bend, Lake Huron, July 20, (Saunders).

2,288. *Nycterophæta luna*, Morr. Aweme, June 25, (Criddle). A most beautiful silvery white species, now first recorded from Canada.

2,302. *Heliothis scutosus*. Vernon, very common, Aug. 11, (Harvey). Kaslo, one specimen, (Cockle).

2,332. *Schinia trifasciata*, Hbn. Grand Bend, Lake Huron, Aug. 20, Saunders).

Pseudotamila Avemensis, Dyar. Aweme, Aug. 1, taken in some numbers in the sand hills, near a tamarac swamp on the flowers of *Helianthus petiolaris*, in the daytime. (Criddle). Two freshly-emerged specimens were taken crawling quickly over the hot sand in the same locality, July 18. (Fletcher and Criddle.)

2,494. *Autographa rubidus*, Ottol. Ottawa, (Young). Only one specimen.

2,496. *Autographa brassicæ*, Riley. Toronto, Sept. 2, (Saunders).

2,498. *Autographa oxygramma*, Geyer. London, (Bethune). Toronto, Saunders). Orillia, (Grant). A southern species.

2,508. *Autographa vaccinii*, Hy. Edw. This was recorded in 1903 as "very common at St. John, N.B." (McIntosh); but Dr. Ottolengui writes recently: "I obtained material from Mr. McIntosh, so labelled, but they were *octoscripta*. I am moderately certain that *vaccinii* has never been found except on Mount Washington, or the neighboring peaks."

2,519. *Autographa falcigera*, Kirby, a. *simplex*, Gn. Very abundant on red clover at Vernon in August. Not I think previously recorded from Brit. Columbia. (Harvey.) Mr. Venables also found it common at Vernon.

2,528. *Autographa Sackenii*, Grt. Mayo Lake, Yukon, Aug. 7, (Keele).

2,540. *Ogdoconta cinereola*, Gn. London, July 22, (Bethune).

2,548. *Pœctes oculatrix*, Grt. Aweme, June 20, (Criddle). A striking species. See figure in Holland's Moth Book, Plate 29, f. 4.

2,601. *Eustrotia albidula*, Gn. London, June 25, (Bethune).

2,604. *Eustrotia concinnimacula*, Gn. Trenton, June 7, 2 sp. (Evans).

2,826. *Catocala relicta*, Wlk. Millarville, Sept. 3—5, at light and sugar. Never before seen on Pine Creek. (Dod.)
2,827. *Catocala cara*, Gn. Coldstream, Ont. Aug. 27, (Wood).
2,829. *Catocala marmorata*, Edw. Hyde Park, Ont., Aug. 21, (Morden).
2,839. *Catocala aspasia*, Strk. Cartwright, only one, (Heath).
2,855. *Catocala faustina*, Strk., b. *verecunda*, Hulst. Cartwright, (Heath).
2,856. *Catocala irene*, Behr. New Westminster, (W. A. Dashwood-Jones).
2,856. *Catocala irene*, Behr., b. *volumnia*, Hy. Edw. Victoria, Sep. 15, (Hanham).
2,866. *Catocala innubens*, Guen. and C. *scintillans*, Grote. Hyde Park, Ont., Aug. 23, (Morden).
2,905. *Catocala gracilis*, Edw. Ottawa, (Young).
2,923. *Remigia repanda*, Fab. Abundant, Toronto, Sept. 29.—Oct. 10, (Saunders).
2,991. *Homoptera calycanthata*, S. & A. Kaslo. Fairly plentiful, several beautiful varieties, one with bright blue banding. (Cockle.)
3,002. *Homoptera duplicata*, Bethune. Wellington, (Taylor). New to B. C. list.
3,022. *Zanclognatha obscuripennis*, Grt. Vernon, July, (Venables).
3,024. *Zanclognatha ochreipennis*, Grt. London, July 14, (Bethune).
3,159. *Cerura scitiscripta*, Wlk., a. *multiscripta*, Riley. Aweme, June 15, (Criddle).
3,211. *Tolype laricis*, Fitch. Trenton, one specimen Sept. 17, (Evans).

GEOMETRIDÆ.

Canadian collectors have devoted considerable attention to these interesting moths during the past season, and many have taken advantage of the kind offer made by Rev. G. W. Taylor to identify their material. Mr. Taylor has furnished me with the following interim report, and fuller papers will appear later.

"At the request of Dr. Fletcher I gladly furnish some notes on the principal species of Geometridæ referred to me during the year by Canadian collectors.

Beginning at the east.—I have beeen able through the kindness of Mr. A. F. Winn, of Montreal, to see specimens of most of the species occurring at Montreal and Quebec. Three are additions to the list.—

Rachela bruceata, Hulst.
Plagodis serinaria, Herr-Sch.
Cleora umbrosaria, Hübner.

Two species were on the list 'Geometridæ taken at Quebec and Montreal,' by G. E. J. Bowles, Can. Ent., XV., p. 164., under other names, viz.: *Rheumaptera sociata*, as Rheumaptera unangulata, and *Therina fiscellaria*, as Therina fervidaria. With regard to the first of these,—In all the old lists and collections the insect stands as *R. unangulata*. Whether the true *Hydriomena unangulata*, as it is now called, really occurs in America or not I cannot say of my own knowledge. I have a good series of European specimens, but have not so far seen any taken in North America. The specimens from Montreal, Winnipeg and British Columbia, of which I have seen very many, are quite clearly all *Rheumaptera sociata*.

With regard to the Therinas, formerly *Therina fervidaria*, Hubner, and *T. fiscellaria*, Guenee, were considered to be one species, which went under

the older name of *fervidaria*. (See Packard's Monograph, p. 493.) This name, therefore, was the one placed on the older lists. The two forms are now considered distinct; but it is the form *fiscellaria* that is so abundant in Canada and of which our western *somniaria*, Hulst, is the representative. *T. fiscellaria* and *T. somniaria* feed as larvæ on deciduous trees, while *T. fervidaria* feeds on Conifers.

From Ottawa I have received a number of splendid specimens from Dr. James Fletcher and Mr. C. H. Young; indeed, the insects sent by the last named are more beautifully set up than any I have ever seen in any collection.

Mr. Young has sent me the true *Nyctobia vernata*, Packard, under which name one usually receives *anguilineata*, Grote, (*fusifasciata*, Walker).

He has also sent me specimens of the moth which stands on our lists as *Eustroma prunata*, L.

Mr. Young's specimens, however, are not really conspecific with this European insect. Neither do they agree with our western form, which Dr. Hulst separated under the name *Neolexia xylina*. For the present I have placed the Ottawa moth in my cabinet as *Eustroma triangulata*, Packard, (5th Rept. Peab. Acad. Science, p. 54.), as it is undoubtedly the form referred to by Dr. Packard under that name. I will point out the differences between the three forms : *prunata, triangulata and xylina* in a paper on our American Eustromas, which I hope shortly to publish.

Mr. Young has also sent me a beautiful specimen of *Anaplodes remotaria*, Walker, taken at Meech Lake, Que. Among the moths sent by Dr. Fletcher were specimens of *Eupithecia interrupto-fasciata*, from larvæ found by Mr. W. Metcalfe on *Juniperus communis* in May. This was considered by Packard himself (Monograph, p. 52.) to be a synonym of *Eupithecia miserulata*, Grote, and in the Monograph Packard actually reprints his own description of *interrupto-fasciata* almost word for word as the description of *miserulata*. The American *Eupithecia* are in a state of great confusion (See note at end of this paper). Nearly all the specimens sent out by eastern collectors bear the label *E. miserulata*, and two or three different larvæ have been described under this name. (Compare the descriptions in Packard's "Insects injurious to Forest and Shade Trees, 1890." pp. 190, 910 and 919.) But if Grote's original description is to count for anything, his species is quite different from Packard's and easily to be distinguished.

Miserulata has a linear discal spot on the fore wing and is *without* any black band on the 2nd segment of the abdomen. It flies in April and May.

Interrupto-fasciata has a large round discal dot and a distinct black band on the 2nd segment of the abdomen. It flies in August.

Several collectors have been good enough to furnish me with specimens from Manitoba, and, as a result, I can add 14 species to Mr. Hanham's list published in the Canadian Entomologist, vol. XXXIII., p. 213 et seq.

Rheumaptera luctuata, Dennis & Schiff. Aweme, (Criddle).
Cinglis ancellatea, Hulst. Aweme, (Criddle).
Synchlora liquoraria, Guenee. Aweme, (Criddle).
Macaria infimata, Guenee. Cartwright, (Heath).
Homochlodes fritillaria, Guenee. Winnipeg, (From Dr. W. Barnes.)
Cleora pampinaria, Guenee. Winnipeg, Cartwright, Aweme.
Therina fiscellaria, Guenee. Cartwright, (Heath). Beulah, (Dennis).
Ennomos magnarius, Guenee. Cartwright, (Heath).
Gonodontis duaria, Guenee. Beulah, (Dennis). Aweme, (Criddle).
Euchlæna astylusaria, Walker. Aweme, (Criddle).

Euchlæna marginata, Minot. Cartwright, (Heath). Aweme, (Criddle).
Eutrapela kentaria, Grote. Winnipeg, (Hanham).
Caberodes majoraria, Guenee. Cartwright, (Heath).
Sabulodes (?) *furciferata*, Packard. Cartwright, (Heath).

Mr. T. N. Willing sent me a nice lot of moths from Regina and some points in Alberta.

Among them were the following:—

Rheumaptera rubrosuffusata, Packard. 'North of Olds, Alberta,' 25, iv., 97.
Annemoria bistriaria, Packard. Lethbridge, 11, vii., 04. New to Canadian list.
Pherne jubararia, Hulst. Olds, 19, ix., 98.
Euchlæna marginata, Minot. 'North of Olds, Alberta,' 8, vi., 98.

and a long series of what I take to be *Cymatophora bitactata*, Walker. These last were taken at Regina in August of the present year.

Mr. F. H. Woolley Dod, of Calgary, has sent me a complete series of his captures in this family. It contains many difficult forms and several undescribed species, but I must defer comment on them for the present as I feel they are entitled to be dealt with in a separate paper. The Calgary district furnishes many additions to the Canadian list. Its fauna includes a large number of Manitoba species with a sprinkling of Pacific coast forms, e.g. *Mespleuca gratulata*. There are also of course a large number of species peculiar to the Rocky Mountain region. I may here very gratefully acknowledge Mr. Wolley-Dod's liberality and the great help he has given me.

In British Columbia the year has been made memorable by the publication of Dr. Dyar's elaborate paper on the Kaslo Lepidoptera.

In this paper Dr. Dyar has described the following species and varieties as new to science and therefore of course new to Canada:

Talledega montanata, Packard, var. *magnoliatoidata*, Dyar.
Tephroclystia niphadophilata, Dyar.
" *cootenaiata*, Dyar.
" *cosloata*, Dyar.
" *columbiata*, Dyar.
" *bifasciata*, Dyar.
" *subfoveata*, Dyar.
Mesoleuca simulata, Hubner, var. *Otisi*, Dyar.
Aplodes rubrifrontaria, Packard, var. *Darwiniata*, Dyar.
Macaria minorata, Packard, var. *incolorata*, Dyar.
Selidosema humarium, Guenee, var. *emasculatum*, Dyar.
Melanolophia canadaria, Guenee, var. *subgenericata*, Dyar.

I shall not be surprised if the two last named prove to be not new varieties, but new species.

Dr. Dyar has also identified the following European species of geometridæ amongst his Kaslo captures:

Tephroclystia laquæaria, Herr-Sch.
" *satyrata*, Hubner.
" *lariciata*, Freyer.
Eucymatoge linariata, Fabricius.

Mr. Cockle, of Kaslo, to whom is due the credit for the discovery of this rich field has most generously placed in my collection specimens of nearly all the species of Geometridæ taken in his neighborhood.

Mr. E. P. Venables, of Vernon, B.C., sent me a few moths, and among them to my surprise was a specimen of *Sabulodes lorata*, Grote, taken at Vernon, and two specimens of *Eudule mendica*, Walker, also taken at Vernon last June. I should not have expected to find either of these well known eastern species west of the Rocky Mountains.

Mr. R. V. Harvey collected in the Vernon district for a few days in August last and has sent me from amongst his captures :

Cymatophora sulphurea, Packard, taken 15th August, 1904. The first recorded from B. C., and

Eois Californiaria, Packard. I think the real thing and distinct from *Leptomeris sideraria*, Guenee, with which Dr. Hulst united it.

Mr. Harvey has also generously given me a specimen, taken in May, 1903, of *Nyctobia viridata*, Packard. I cannot see any difference between this specimen and others received from New Brighton, Pennsylvania. This species was made the type, by Dr. Hulst, of a new genus *Cysteopteryx;* but though *viridata* is named as the type, the characters of the genus are evidently drawn from a different insect. (See Pearsall, Can. Ent. xxxvi., p. 208.) Hulst afterwards redescribed this species as *Agia eborata;* but this of course falls before Packard's older one.

It appears to me that neither *Cysteopteryx* nor *Agia* can be recognized as valid genera and that the species *viridata* must for the present at least remain in the genus *Nyctobia*.

On Vancouver Island, at Victoria, Goldstream, Duncans and Wellington, large collections have been made.

A new species of *Eupithecia* has been found in the collection of Mr. E. M. Anderson and named *E. harlequinaria* by Dr. Dyar, and a new species *Gabriola Dyari* has been described by myself in Can. Ent., xxxvi., p. 255.

Hydriomena reflata, Grote, has been taken by Mr. Anderson rather commonly at Victoria, and I owe a fine series in my collection to his generosity.

Plagodis approximaria, Dyar. A fine pair of this, the most beautiful species in the genus, was bred by me from larvæ found in September, 1903, and another specimen was taken on the wing by Mr. Bryant, at Wellington, in May.

Phengommata Edwardsata, Hulst. A fine specimen of this rare moth was given to me by Mr. Joseph Richards, of Wellington.

Alcis latipennis, Hulst. This species occurred for the first time at Wellington, 27 August, 1904. Mr. Bryant took it last year at Cameron Lake in the last week of July.

Many other species of British Columbian Geometridæ merit a place on this list; but, as I am now engaged in preparing for publication in the Canadian Entomologist, a paper on the Geometridæ of this province, with descriptions of a number of new species, I think it best to reserve for it the bulk of my notes on the family.

In conclusion, I should like to say that, when the above mentioned paper is out of hand, I propose to attempt a revision of the North American species of the very difficult genus *Eupithecia*. I have about 60 species in my own cabinet at the present time, and I anticipate that at least 100 species will eventually be found to occur in North America. Very few of these moths are at all well known; and, indeed, the bulk of the species so far described could not be recognised by description alone or without comparison with the type specimens. I shall be very grateful if collectors in Canada and elsewhere will endeavour to collect series of these interesting

moths and allow me to see them. The metropolis of the genus in North America is evidently in the West, the eastern species being comparatively few, and, as I have shown above, are far from being well understood.

I will return specimens sent to me, determined to the best of my ability and will gladly give co-types of our new western species, as far as they will go, to those who are good enough to help me. It should be borne in mind that these small moths make much better specimens if spread while fresh. They suffer more or less damage in the process of relaxing, and a rubbed specimen in a genus in which species run so close together is comparatively useless."—G. W. Taylor.

The following notes on geometers have also been received :

3,501. *Cinglis fuscata*, Hulst. Goldstream, B.C.; flies freely by day on open hillsides, high up, May 24 to end of June. (Hanham.)

3,651. *Sciagraphia heliothidata*, Gn. Trenton, Aug. 6, one specimen, (Evans).

Gabriola Dyari, Taylor. Oak Bay, Victoria. I have taken this species here since 1901, Aug. 1 to 21, at light in close pine woods in one locality. (Hanham.)

3,782. *Nepytia phantasmaria*, Strk. Mr. Harvey writes that the locality given in last year's Ent. Record "Victoria" should have been Vancouver, as up to the present time he has no record of its having been taken on Vancouver Island.

3,840. *Selidosema excelsarium*, Strk. Goldstream, B.C., at rest May 24, (Hanham).

3,841. *Selidosema albescens*, Hulst. Oak Bay, Victoria, Aug. 23, one specimen, (Hanham).

3,876. *Apocheima Rachelæ*, Hulst. Millarville, one male at rest, May 9, (Hudson).

3,883. *Erannis defoliaria*, Clem., a. *vancouverensis*, Hulst. Kaslo. One male, Oct. 14, 1903; 3 males and 2 females, 1904, all taken under electric light. Not previously recorded from the mainland. (Cockle.)

3,976. *Synaxis pallulata*, Hulst. Oak Bay, Victoria, Sept. 10 to 13, several flying by day.

Micro-Lepidoptera.

There has been a most satisfactory and encouraging revival in the study of Canadian micro-lepidoptera. This has been in the largest measure due to the kindness and untiring work of Mr. W. D. Kearfott, who has examined and named for Canadian collectors during the past year, an enormous number of specimens. Mr. August Busck, who in the past has done so much for Canadians, during 1904, was specially engaged at the St. Louis Exhibition, but will always be willing to receive specimens of tineids for examination and for deposition in the U. S. National Museum. I again take the opportunity of pointing out the wisdom of Canadian collectors sending specimens of rare species to this international depository, where every conceivable care is taken to preserve the specimens and make them accessible for the use of students from the whole world. It is to be hoped that in time we may have in Canada a National Museum, where proper provision will be made for the preservation of representative entomological collections; but until that is done, undoubtedly it is the duty of Canadian collectors first to build up the collection of the Entomological Society of Ontario and then de-

posit as complete a series and as perfect specimens as are to be obtained in Washington, where not only is every courtesy extended to Canadian students by the officers in charge of the different departments, but better provisions are made for safe-guarding the specimens, than anywhere else.

Mr. Kearfott has taken a special interest in Canadian species and has kindly supplied me with the following condensed report of his work during the past year. Mr. Kearfott also makes the following generous offer :— "I have still a supply of separates of my 'Suggestions for Setting, Collecting and Breeding Micro-Lepidoptera,' which were published in Entomological News. I shall take pleasure in mailing a copy of these to anyone who will take the trouble to write and ask for it."

Mr. Kearfott writes as follows :—

"The acceptance of Dr. Fletcher's kind invitation to contribute a few notes on this subject, gives me the opportunity to congratulate the Canadian entomologists upon the rapid development of a wide spread interest in the study of and desire to know more about these the most beautiful of all of our Lepidoptera; and at the same time to thank all of them and express my obligation for the many opportunities given me for studying large and small collections from many localities, between Montreal and Vancouver. It is, of course, natural that interest in these small moths should awaken last; first, because it was necessary to acquire proficiency by handling and expanding the larger ones, and second, the very great difficulty, heretofore of getting specimens named. I know by experience that collectors have little use for species that have to be stored in their 'unknown' boxes, and to maintain the interest and incite greater enthusiasm the supply of names must be equal to the demand. Students in America have been very greatly handicapped, in the work of identification, by reason of the fact that descriptions are scattered through many publications, the majority European, and that the types likewise are not readily available for comparison. For instance, in the Tortricids, of which there are about five hundred species in Dyar's Catalogue less than ten per cent. of the types are in public museums, the balance being in inaccessible private collections in this country or in European collections. Hence, the doubt that must oftentimes remain, even after repeated readings of a description, which would be instantly dispelled by the sight of the type. It is my ambition to push these clouds of doubt and uncertainty away, and in their place let in the flood of sunlight of popular knowledge, and, to do so, purpose trying to build up at least two collections: one at the National Museum Washington, and one at the Entomological Society of Ontario's rooms at London, by depositing co-types or carefully compared named specimens where anyone can freely go and ask no favor. This work must necessarily be slow, but, with the continued assistance of my good friends in Canada, it will be expedited to the full extent of my ability. There is an explanation running through these remarks that will be recognized as an apology by some, whose specimens have been retained apparently entirely too long, but, it must be remembered, that even those of us who have worked the hardest over descriptions and structural characters, are little more than beginners, yet groping along in the dark, thinking they are sure of an identification one day and doubtful the next, but always hoping and waiting for the something to turn up that will evolve certainty out of doubt.

For all of these reasons, a list of notable captures, is not an easy thing to prepare, practically all Micro-Lepidoptera captures are notable, inasmuch as Canadian records are almost entirely barren of their names. But

a goodly start will be made during 1905 in the pages of the *Canadian Entomologist* towards a Canadian list, that I hope to see largely added to from year to year.

From Mr. T. N. Willing, Regina, the following are of especial interest:

Olethreutes vetulana, Wslm. Recorded from California and Texas.
Eucosma argentialbana, Wlsm. Recorded from Texas.
Eucosma culminana, Wlsm. Recorded from California.
Eucosma illotana, Wlsm. Recorded from Oregon.
Thiodia parvana, Wlsm. Recorded from Oregon.
Semioscopsis inornata, Wlsm. Locality 'unknown' in Dyar's Catalogue; this is first record of locality.

From Mr. Norman Criddle, Aweme, Man., a large and beautifully expanded collection, two of which must be noted here.
Pseudogalleria inimicella, Zell. Hitherto only taken in the Atlantic States. The larvæ are borers in the stems of *Smilaceæ*. (Busck.)
Eucosma Scudderiana Clem. Common in Eastern States, not before recorded from so far west.

I have also received from Manitoba, very interesting lots from Mr. E. Firmstone Heath and Mr. A. J. Dennis, a complete paper on all of this Manitoba material will shortly appear in the *Canadian Entomologist*.

From Rev. G. W. Taylor and Mr. Theodore Bryant very complete collections of Vancouver Island specimens. A paper on these will follow that on the Manitoba material.

From Mr. C. H. Young, Hurdman's Bridge, near Ottawa, Ontario, the most beautifully prepared examples I have ever seen of about seventy species, some of them new. His list will appear elsewhere. From Ontario I have also a small collection from Mr. H. S. Saunders, of Toronto, and another from Mr. Albert F. Winn, of Montreal, whose records of captures will be elsewhere recorded.

It may not be amiss to state that at the present time the localities that have been the least worked and from which the most valuable material can be expected, are Eastern Canada, the Maritime Provinces, and of course all of the territory north of Eastern Canada. Both Mr. Young's and Mr. Winn's collections contain many surprises, and throughout the extreme eastern region will be found species, hitherto only known from Labrador and Northern Maine and doubtless connecting links with the European fauna. It is hardly necessary to add that my services are always at the disposal of anyone wanting names of species of the families in which I am working."—W. D. Kearfott.

Among the specimens of Micros reared at Ottawa was one of more than usual interest *Simœthis Fabriciana*, L., several specimens of which were bred by Mr. Arthur Gibson from larvæ collected 24th May, 1901, in the tips of stinging nettles (*Urtica gracilis*). Specimens were again reared by Mr. Young last summer. Mr. Kearfott says of this moth that it is a European species never previously recorded from America. The Ottawa specimens are slightly larger than the typical form.

Another small moth, of considerable interest from the injury done by the larvæ to the young twigs of the Ash-leaved maple in Manitoba and the Northwest Territories, has recently been named *Proteoptery.x Willingana*, by Mr. Kearfott. (Can. Ent., xxxvi., p. 306.)

Coleoptera.

(Arranged according to Henshaw's List of the Coleoptera of America, North of Mexico.)

As announced in the Entomological Record of 1903, Mr. E. D. Harris, of 280 Broadway, New York, has been paying special attention to Canadian Cicindelidæ, and has very kindly supplied me with the following notes on the rarer species which have come into his hands. Some further records shown between brackets—have been kindly sent to me by Mr. C. W. Leng, of 83 Reade Street, New York, another well known student of these beetles.

18. *Cicindela longilabris*, Say. Cape Breton, taken by A. D. McIntyre. Black, or very dark brown (corresponding with the form as taken freely in the Province of Quebec, at Mt. Desert on the Maine coast, and sparingly in August, 1904, in the Adirondack mountains in N.Y.); humeral and post-humeral dots, slender middle band often broken, and small sub-apical dot. July and August.

18*c*. *longilabris*, Say, var. *montana*, Lec. A single specimen sent me by Mr. Venables, taken at Vernon, B.C., April. [Aweme, Man., Criddle, (C.W.L.)] Regina (Willing).

longilabris, Say, var. Kaslo, B.C., and vicinity, taken by Mr. Cockle. Brilliant green (occasionally blue) and deep bronze brown, highly metallic, with all intermediate shadings of color; humeral lunule either entire or broken; middle band broader than in type and frequently extended at margin, anteapical dot. May, August and September.

25*b*. *purpurea*, Oliv., var. *graminea*, Schaupp. Vernon, B.C. Sent to me by Mr. Venables. A single specimen in the series approaches the typical insect of Olivier in its colorings; but the others closely correspond to Schaupp's description.

25*f*. *purpurea*, Oliv., var. *limbalis*, Klug. Cape Breton, taken by Mr. McIntyre, represented by but two specimens, in one of which the middle band is less sinuate and shorter, and in the other much more deflexed and extended than in the P. Q. race. There is no doubt as to the identification, but the specimens would seem to indicate a wide divergence in a series from this region. August. [Aweme, Criddle (C.W.L.)]

32 *vulgaris*, Say. Cape Breton, taken by Mr. McIntyre; a single specimen of the *horiconensis* form of Mr. Leng, (Revision of Cicindelidæ, Trans. Am. Ent. Soc., XXVIII.), but with markings more attenuated than usual. August.

Kaslo, B.C., and vicinity, a very large series taken by Mr. Cockle. The variety has distinctive characters; more slender and arched than type; humeral lunule broken and the anterior portion often absent; middle band scarcely touches the margin; apical lunule generally complete, often strongly accentuated, occasionally broken; color variable, from coppery bronze to a dull green bronze. April to October, very plentiful at the close of season. The same variety was taken in April at Vernon by Mr. Venables.

Calgary, N.W.T., taken by Mr. Willing, the variety generally recognized as *obliquata*, Dej., distinguished by the broad markings, entire humeral lunule, middle band extended at the margin, and apical lunule entire and strongly accentuated. In the series

from Calgary there is no variation in color; the greenish reflections and metallic lustre so pronounced in the Kaslo form are absent. [Aweme, Criddle. (C.W.L.)]

33*c*. *duodecim guttata*, Dej. Cape Breton, taken by Mr. McIntyre. In the series of one hundred specimens no divergence from the type in maculation is noticeable, but the variation in color mentioned by Mr. Leng in the Revision is quite apparent, many individuals being dull grayish green, and a single one is blue. Abundant in August.

33*d*. *oregona*, Lec. Kaslo, B.C., and vicinity. In a very large series from Mr. Cockle, the adherence to the type form is universal in the maculation, but the variation in color that is noticed in the Cape Breton specimens of 33*c*. *duodecimguttata*, occurs here, the tendency being towards a blue gray tone in many specimens. It seems to be plentiful through the summer.—E. D. Harris.

19*d*. *Cicindela rugifrons*, Dej. Longueuil, Que., Aug. 3, (Stevenson.)

153. *Elaphrus cicatricosus*, Lec. Aweme, June 2, (Criddle.)

378. *Bembidium Oberthuri*, Hayw. Aweme, April 26, an uncommon species, (Criddle). This is "*B. viridicolle*, Laf." of Mr. Hayward's revision of the genus, but the true *viridicolle* is known only from Texas.

550. *Pterostichus punctatissimus*, Rand. Rimouski, Que., June, (Mr. Beaulieu.)

711. *Diplochila impressicollis*, Dej. Aweme, May, June, (Criddle).

752. *Pristonychus complanatus*, Dej. Victoria. A pair under bark, Feb'y., (Hanham). This is a European species occasionally taken in North America. A very interesting capture.

753. *Pristonychus terricola*, Hbst. St. John, (McIntosh). Prof. Wickham writes of this: "The first American specimen I have seen, although it was already known to occur in this country as well as in Europe."

795. *Platynus carbo*, Lec. Trenton, Sept. 29, (Evans).

1,244. *Laccophilus proximus*, Say. Aweme, June 16. (Criddle).

1,646. *Hydrobius scabrosus*, Horn. Vancouver, April 11, (Harvey). Metlakatla and Inverness, B.C., (Keen).

9,508. *Lomechusa montana*, Casey, var. *hirsuta*, Wasm. Aweme, in nest of wood ants (*Camponotus*), July 30, (Criddle). The varietal identification is provisional (H.F.W.).

2,140. *Staphylinus rutilicauda*, Horn. Goldstream, B.C., May 24, a pair under stones, June 1, 1901, (Hanham). Vancouver, (Harvey). A rare and beautiful species.

2,234. *Philonthus aurulentus*, Horn. Aweme, May 12-28, (Criddle). Interesting for locality.

2,434. *Stenus croceatus*, Casey. Trenton, June 19, (Evans).

2,820. *Tanyrhinus singularis*, Mann. Vancouver, Feb. 28, (Harvey). This remarkable and very rare staphylinid is figured in Can. Ent., vol. XXIX, p. 287.

3,105. *Hyperaspis undulata*, Say. Trenton, 1 sp. May 4, (Evans).

3,380. *Conoscelis ferruginea*, Sahl. Trenton, one at light, July 16, (Evans).

3,739. *Meligethes mutatus*, Harr. Aweme. Very plentiful on flowers of Erysimum arkansanum, July, (Criddle).

3,916. *Lara avara*, Lec. Vancouver, July 15, (Harvey). Prof. Wickham says: "One of the rarest of North American beetles previously known only from California. The first Canadian record."

3,984. *Aracopus monachus*, Lec. Vancouver, May 2, (Harvey).
4,081. *Adelocera obtecta*, Say. London, May 24, (Bethune).
4,095. *Alaus melanops*, Lec. Shawnigan Lake, B.C., July 1, (Hanham).
5,514. *Aphodius erraticus*, L. A European species which has been found around Baltimore and has now been taken under stones on waste ground at Montreal, May 1, (K. R. Stevenson).
5,524. *Aphodius congregatus*, Mann. Vancouver, several, March 19, (Harvey).
5,568. *Aphodius prodromus*, Brahm. Trenton, May and October, (Evans). This is now one of the commonest dung beetles in Central Ontario.
5,983. *Opsimus quadrilineatus*, Mann. Elk Lake, Victoria, August, (Hanham).
6,005. *Phymatodes decussatus*, Lec. Victoria, 2 sp., June 26, July 1, (Hanham).
6,013. *Callidium vile*, Lec. Goldstream and Victoria, June, (Hanham.)
6,101. *Callimoxys sanguinicollis*, Oliv. St. Hilaire, Que., one pair in blossoms of cherry, May 24, (Chagnon).
6,161. *Stenophenos notatus*, Oliv. Montreal, one specimen, on log, June 12, (Chagnon).
6,201. *Neoclytus erythrocephalus*, Fab. London, July 8, (Bethune).
6,219. *Atimia dorsalis*, Lec. Vancouver, May 13, (Harvey).
6,226. *Necydalis lævicollis*, Lec. Vancouver, (Harvey).
6,228. *Ulochætes leoninus*, Lec. Vancouver, May 18, (Bush.) A rare and remarkable beetle.
6,239. *Toxotus flavolineatus*, Lec. Goldstream, July, 1901, (Hanham). One on the wing, Shawnigan Lake, (Harvey). A rare and handsome beetle.
6,250. *Pachyta rugipennis*, Newm. Hull, Que. About 40 specimens of this handsome longicorn were taken by Mr. W. Metcalfe pairing at the base of a dead pine tree on 29 May last. Originally described from Canada, but very rare.
6,335. *Leptura vagans*, Oliv. London, June 25, (Bethune).
6,345. *Leptura biforis*, Newm. St. John's, Que., July 8, (Chagnon).
6,361. *Leptura mutabilis*, Newm., black var. Levis, Que., (Rev. Elias Roy).
6,440. *Hyperplatys aspersus*, Say. Montreal, June 12, beaten off willows, four specimens, (Chagnon).
6,454. *Pogonocherus Oregonus*, Lec. Victoria, July 27, 1902, one specimen only, (Hanham.)
6,479. *Saperda mutica*, Say. Montreal, July 14, on willow, (Chagnon).
6,487. *Saperda puncticollis*, Say. London, June 9, (Bethune). Montreal, June 12, (Chagnon); Ottawa, on grape vine, July 5, (Guignard).
6,538. *Donacia pubescens*, Lec. St. Hilaire, Que., July 1, (Stevenson, Chagnon).
6,771. *Graphops nebulosus*, Lec. Aweme, April, May, (Criddle). "Interesting for locality and will probably be found in numbers later." (H. F. Wickham.)
6,814. *Chrysomela pnirsa*, Stal. St. Hilaire, Que., May 24, (Mrs. C. Stevenson).
6,827. *Plagiodera oviformis*, Lec. Aweme, June 11, (Criddle).
7,654. *Emmesa connectens*, Newm. St. John, (McIntosh). This is an elongate beetle about one-third of an inch in length, blackish in color and each elytron bears an antemedian and apical spot of yellow.

7,713. *Priognathus monilicornis*, Rand. Vancouver, June 5, (Harvey). Widely distributed in the north but very rare. (H. F. W.)

7,724. *Calopus angustus*, Lec. Victoria, April 19. (Hanham). Metlakatlah, (Keen). "Rare in collections, ranges from California to Northern British Columbia." (H. F. W.) This is figured by Prof. Wickham, Can. Ent. XXX, p. 150.

7,782. *Mordella octopunctata*, Fab. London, July 16, (Bethune).

8,487. *Lixus rubellus*, Rand. Aweme, June 5, (Criddle).

8,513. *Stephanocleonus plumbeus*, Lec. Aweme, June, July, (Criddle). "Described from Lake Superior and New Mexico, quite rare." (H.F.W.)

8,581. *Lixellus filiformis*, Lec. Aweme, June 7, (Criddle).

8,628. *Acalyptus carpini*, Hbst. Aweme, May 15, (Criddle). Interesting for the locality.

8,629. *Coccotorus scutellaris*, Lec. Aweme, Aug. 28. I found this insect common in the stones of the Sand Cherry (*Prunus pumila*), (Criddle.)

8.714. *Conotrachelus nenuphar*, Hbst. Aweme, June 30, July 8, (Criddle). The wild plum (*Prunus nigra*) is common in Manitoba; but I have no record of injury to the fruit by the Plum Curculio. The beetle also attacks the haws of *Cratægus*.

8,835. *Coeliodes acephalus*, Say. Trenton. This is the first time I have ever taken this, June 19. (Evans.)

8,872. *Baris transversa*, Say. Trenton, May 5, (Evans).

Hymenoptera.

There are few records of work among the Canadian hymenoptera during the past season. Mr. Harvey, of Vancouver, Mr. Hanham, of Victoria, B.C., and Mr. Willing, of Regina, N.W.T., have collected in all families of this order; and Mr. E. P. Venables, at Vernon, B. C., has made a specialty of the *Bombi*. The distribution of the species is being worked out, and reference to rarities is held over for the present. Several of our lepidopterists are paying attention to hymenopterous parasites, which is a subject much requiring special study.

Orthoptera.

Dr. E. M. Walker, of Toronto, has named several collections of Canadian material and is publishing results of his examinations in the *Canadian Entomologist*. Mr. Venables, of Vernon, B.C., Mr. Willing, of Regina, N.W.T., and Mr. Criddle, of Aweme, Man., are accumulating material. Mr. A. N. Caudell, has published some notes on British Columbian and Northwest species.

Blattidæ.

During the past summer there have been three interesting records of the occurrence in Canada of the beautiful southern cock-roach, *Panchlora viridis*, Burm. Two specimens are reported from Montreal by Mr. Charles Stevenson, one having been taken on the sidewalk in the street and the other flying around a lamp in a neighbor's house. The evidence was that these specimens had been introduced in bunches of bananas. Mr. Stevenson also collected under similar circumstances some other species of cock-roaches which had also been introduced with bananas. Another specimen was found by Miss

Dorothy Coates, at Winnipeg, inside a box of candies purchased at the Winnipeg exhibition. Mr. Cockle found a specimen of *Panchlora viridis* at Kaslo, B.C., which he believed had been introduced with bananas. Under lepidoptera, reference is made to *Ceramidia Butleri*, a moth from the South which came into Canada in the same way and was found by Mr. Cockle at Kaslo.

Neuroptera.

Mr. G. W. Taylor and some of the British Columbian members have begun, with the help of Mr. Nathan Banks, to work up the Neuroptera, Trichoptera and Plectoptera of their Province and several new species have been discovered.

Diptera.

Bittacomorpha clavipes, Fab. London, June 18, (Bethune).
Xylophagus fasciatus, Walk. Vancouver, May 24, (Harvey).
Sargus viridis, Say. High River, Alta., (T. Baird).

Nemotelus nigrinus, Fall. Ottawa, June 26, (Metcalfe).
Chrysops proclivis, O. S. Vancouver, June 4, (Harvey).
Chrysops mitis, O. S. Weyburn, Assa., June 21, on horses, (Willing).
Chrysops noctifer, O. S. Vancouver, June 4, (Harvey).
Triptotrichia lauta, Lw. Victoria, B.C., (Hanham).
Rhyphus punctatus, Fab. High River, (Baird).
Leptis dimidiata, Lw. Vancouver, June 11, (Harvey).
Leptis maculifera, Bigot. Mount Arrowsmith, B.C., July 28, (Fletcher).
Asilus notatus, Wied. Regina, July 4, (Fletcher).
Cyrtopogon præpes, Will. High River, (Baird).
Laphria vultur, O. S. Vancouver, May 15, (Harvey).
Anthrax alternata, Say. Victoria, (Hanham).
Anthrax fulviana, Say. Victoria, Sept. 13, (Hanham). Vancouver, Aug. (Harvey.)

Anthrax lucifer, Fab. Vernon, August, common, (Harvey).
Anthrax Sackenii, Coq. Fort Walsh, Aug. 23, (Willing).
Spogostylum analis, Say. Mission, B.C., common, Aug. 8 and 9, (Harvey).
Bombylius major, L. Ottawa, May 1, (Metcalfe); Goldstream, B.C. May 17, (Hanham).

Bombylius lancifer, O. S. Okanagan Lake, B.C., May, (Venables).
Dipalta serpentina, O.S. Wellington, July 27, 29, (Harvey).
Systœchus oreas, O. S. Victoria, (Hanham).
Pterodontia flavipes, Gray, Boucherville Island, Que., July 25, (Stevenson).
Chrysotoxum pubescens, Lw. Spruce Grove, Alta., July 21, (Willing).
Melanostoma Kelloggi, Snow. Mer Bleue, near Ottawa, Aug. 23, (Fletcher).
Sericomyia chalcopyga, Lw. Vancouver, common, April-June (Harvey).
Eristalis Meigenii, Wied. Vernon, Aug. 15, (Harvey).
Helophilus latifrons, Lw. High River, (Baird).
Helophilus similis, Macq. Vernon, Aug. 15; Vancouver, Sept. 15, (Harvey).
Helophilus conostomus, Will. Vernon, Aug. 12, (Harvey).

Criorhina nigrinus, Will. Vancouver, not common, April, (Harvey).
Criorhina tricolor, Coq. Mt. Arrowsmith, B.C. July 28, (Fletcher).
Pocota grandis, Will. Victoria, (Hanham). This is a rare species. Specimens will be acceptable at the National Museum, Washington.

Brachypalpus pulcher, Will. Victoria, (Hanham). Vancouver, May 7, (Harvey).
Xylota barbata, Lw. Vancouver, June 11, (R. Sherman).
Physocephala Burgessi, Will. Vancouver, June 4, (Harvey).
Belvosia trifasciata, Fab. High River, July 4, (Baird).
Ocyptera Carolinæ, Desv. Victoria, (Hanham).
Exorista cheloniæ, Rond. Victoria, (Hanham).
Tachina mella, Walk. Reared at Ottawa from larvæ of *Clisiocampa*, received from Lacombe, Alta.
Phorichæta sequax, Will. Indian Head, July 1, (Fletcher).
Gonia capitata, DeG. Vancouver, uncommon, May 14, (Harvey). Vernon, (Venables). Dr. J. B. Smith gives this as a parasite of *Peridroma saucia*.
Epalpus signifer, Walk. Olds, Alta., April 28, (Willing). Ottawa, May 1, (Metcalfe). This handsome tachina was unusually common at Ottawa in 1904, (Fletcher).
Lucilia sericata, Meig. Vancouver, (Harvey).
Bombyliomyia abrupta, Wied. Vancouver, not common. May 14, (Harvey).
Tephronota Canadensis, Johnson. Ottawa, June 26, (Metcalfe, Harrington).
Trypeta occidentalis, Snow. McLeod, Alta., July 5, (Willing).
Tephritis albiceps, Lw. Ottawa, June 26, (Metcalfe).
Sapromyza connexa, Say. Mt. Arrowsmith, July 28, (Fletcher).

FURTHER NOTES ON BASSWOOD, OR LINDEN, INSECTS.

By Arthur Gibson, Division of Entomology, Central Experimental Farm, Ottawa.

In the last Annual Report of this Society, 1903 (pages 50-61), the writer contributed a paper treating of 94 different species of insects which have been found attacking *Tilia Americana*, L. The season of 1904 was a remarkably poor one for insects of all orders in the Ottawa district, and consequently few additional observations were made, but such as were noted are presented herewith, along with one or two other records which were omitted from the above article.

Attacking the Foliage.

Order Orthoptera.

95. The Walking Stick Insect, *Diapheromera femorata*, Say. At the annual meeting of the Entomological Society of Ontario, held last October, Mr. J. B. Williams, of Toronto, spoke of the great abundance of the Walking Stick insect, at Niagara Glen, Ontario, in September, 1904, and said that the species did considerable damage, feeding on the foliage of a number of trees, particularly hickory, butternut and oak. He also told me that he was pretty sure they had been eating basswood. He has since confirmed this, stating that both Dr. Brodie and Dr. Walker, of Toronto, have also found the Walking Stick insect feeding on the basswood.

Order Coleoptera.

96. *Dichelonycha elongata*, Fabr. This common beetle occasionally does considerable damage to the foliage of a number of forest trees. The perfect insects have been observed at Ottawa feeding commonly on the leaves

of linden in June. Other trees upon which the beetles feed are birch, bitter hickory, elm, beech, oak, etc. The beetle is about one-third of an inch long, cylindrical, the body of a dark colour with the wing covers testaceous and more or less tinged with green. Beneath, the body is densely clothed with short white hairs, and is sparsely hairy above. The legs are long and slender, the hind ones being blackish.

Order Lepidoptera.

97. *Gluphisia septentrionalis*, Walker. This is a common species at Ottawa, the larvæ usually occurring on the aspen, *Populus tremuloides*. A single caterpillar of this notodontian, three-quarters of an inch in length, was found feeding on basswood at Ottawa on the 10th August. When mature the larva measures one and a quarter inches in length, and in general appearance is smooth, cylindrical, pale green, with a distinct yellow subdorsal band, and a series of bright red dorsal blotches on all the body segments excepting the abdominal 1st, 2nd and 10th. The head is darker than the body and has on each side a conspicuous black stripe.

98. *Heterocampa bilineata*, Pack. The larvæ of this species were fairly common at Meech Lake, Que., in 1901. Most of the specimens collected had been feeding about five feet from the ground, on the foliage of new shoots. Mature larvæ found by Mr. C. H. Young about the end of August produced moths the middle of the following June. Other food plants of the larvæ of this species are elm and beech. Notes on the larval stages may be found in Packard's "Bombycine Moths of America North of Mexico."

39 of 1903 list. *Coleophora tiliæfoliella*, Clem. One case of the larva of this tineid moth was found attached to a basswood leaf on the 21st June, 1904, the moth emerging on the 30th June. The imago was identified by Mr. W. D. Kearfott, who has sent a description of the moth for publication in the *Canadian Entomologist** This is the first record that we know of, of the species having been found in Ontario.

99. *Ellida caniplaga*, Walk. In Holland's Moth Book linden is mentioned as the food of the caterpillar of this notodontian. The moths have been taken infrequently at Ottawa, the dates of their capture being 13, 16, 17 May, 5, 8 June, and 6 July. We have never collected the larva.

Order Diptera.

68 of 1903 list. The Basswood Wart Gall, *Cecidomyia verrucicola*, O. S. This gall was very common on basswood leaves the past summer at Ottawa. It occurs irregularly in numbers on the same leaf, in numerous cases more than a hundred galls being found on the same leaf.

Order Acarina.

69 of 1903 list. The Linden Gall-mite, *Phytoptus abnormis*, Garman. On the 27 July some leaves of basswood were received from Mr. Z. A. Lash, Four Way Lodge, Lake Rosseau, Ont., which showed the work of this mite.

* This description appeared in the November number, 1904.

Occurring on the Bark.

Order Homoptera.

100. *Eulecanium quercitronis,* Fitch. This large scale insect was found rather plentiful on the twigs of two large trees at Ottawa on the 28th May, 1904, and specimens were sent to Mr. Geo. B. King for identification. Basswood is not mentioned among the food plants of this species in Mrs. Fernald's catalogue of the Coccidae of the World, so this may be a new record of the food plant. On the 19 October further examples were collected from the same trees. These varied in size from 4.5 mm. to 6.5 mm. in length.

Boring into the Wood.

Order Coleoptera.

92 of 1903 list. The Northern Brenthid, *Eupsalis minuta,* Drury. (Fig. 11). Among some insects sent to the Division for identification, by Mr. W. Wintemberg, of Toronto, was a specimen of this beetle, with the note "Two specimens found in a piece of basswood near Washington, Ont." This insect is widely distributed over the United States and Canada. It is chiefly an oak borer.

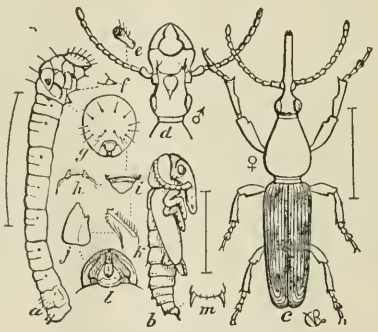


Fig. 11. The Northern Brenthid (*Eupsalis Minuta*), Drury.

101. *Clytanthus ruricola,* Oliv. Mr. W. H. Harrington tells me that he has taken specimens of this cerambycid on basswood stumps and from felled trees. Two dates which he gave me are the 9th and 10th July.

102. *Synchroa punctata,* Newman. The Melandryidæ, the family to which this insect belongs, are feeders in dry wood, dry fungi and dry vegetable matter generally. This particular species is about 5-10ths of an inch in length, of a brown colour, coarsely punctured and pubescent. Mr. Harrington found three pupae under the bark of basswood at Ottawa, from which he bred the beetles.

NOTE ON THE COLUMBINE BORER

(Papaipema purpurifascia, G. & R.).

By Arthur Gibson, Ottawa.

An interesting occurrence of the larvae of *Papaipema purpurifascia*, G. & R. was observed by the writer in the latter part of July, and beginning of August last. This borer cannot be considered a common species in Canada, but it seems to have the habit of occurring occasionally in sufficient numbers to do serious harm to cultivated plants of the genus *Aquilegia*. In 1893, Dr. Fletcher tells me, the larvæ of this species did considerable damage at Ottawa to columbine plants in gardens, but since that date it has not been seen until the present year, when it was noticed in several beds at the Central Experimental Farm. Specimens of the larvæ were also received from Mr. D. Francis, of Perth, Ont., on the 27th July, with the statement that they had destroyed nearly all of the Aquilegias in one of his gardens. He also stated that he had a similar visitation when living at Hamilton, Ont., some ten years ago. The most serious infestation this year at Ottawa occurred in a large bed of hybrids of the beautiful Russian variety, *Aquilegia oxysepala*. In this bed of 135 plants fully 70 per cent. were injured, many being killed outright.

Larvæ were found boring in the roots on the 28th July, all in their mature stage. Many had left the plants, doubtless to pupate, as three pupae were found in the earth near the plants, and one pupa at the very base of the leaves, on the surface of the ground. On the 4th August more full grown larvæ were collected from the roots, also one pupa, and three other larvæ which had begun to pupate. These three latter and the pupa were found near the plants about an inch below the surface. At this date many of the infested plants showed noticeable sign of injury.

The larvæ bore inside the stems of the plants and gradually work their way down into the roots, which are large and tuberous. Here they consume the inner part and reach maturity. In many instances the whole of the inside of the secondary roots had been eaten, nothing being left but the outside covering. The following description was taken of the larvæ; Length, 37 mm.; one specimen measured 40 mm. at rest, and 46 mm. when extended, width at centre, 5.5 mm.: head well rounded, rather quadrate, slightly depressed at vertex, almost tawny, paler towards mouth parts which are dark; ocelli black in a black field; from ocelli to outer edge of the thoracic shield there is a dark band, more conspicuous in some specimens than in others. Thoracic shield, noticeably wider than head, almost the same colour but paler and margined distinctly on each side with black. Dorsum of body salmon colour, below spiracles paler with none of the salmon colour; some specimens much brighter dorsally than others. Dorsal stripe distinct, but pale, same colour as venter. Tubercles black each in a black spot, the size of which varies in different specimens; setae inconspicuous. Laterally there are also a number of black spots, some almost in a line with the spiracles, others above and below. Spiracles black, elongate. Anal shield in most specimens wholly black, but in some reddish centrally. Thoracic feet fulvous darkened at tips; prolegs pale.

From the above description it will be seen that the larvæ had a distinct dorsal stripe, but no subdorsal marking as is mentioned in the description of the mature larva by M. V. Slingerland (Can. Ent. XXIX, 161). In H. Bird's description of the full grown larva no stripes of any kind are mentioned.

Two of the larvæ which were found pupating on the 4th August had changed to pupa by the 5th August, and the moths emerged on the 30th August. Other moths emerged on the 18th and 25th August, and 2nd, 5th, 6th, 8th and 13th September.

The pupa is 20 to 25 mm. in length, and 5.5 to 7.5 mm. in width, at widest part; shiny, reddish brown, darker in the incisures; anterior third of each abdominal segment distinctly pitted, posterior third minutely pitted. Cremaster blackish, bearing two stiff spines, which are distinctly hooked at ends.

INSECTS COLLECTED AT LIGHT DURING THE SEASON OF 1904.

By J. D. Evans, Trenton.

The writer having collected, at light, at odd times in 1901-2 and 1903, usually commencing late in the season and then continued only intermittently, this season a start was made on the 6th of May and continued uninterruptedly, except when the weather conditions were against it, such as rain or extremely cold weather, and for ten days in August while the writer was called away from town.

On the whole the season was very wet and cool, frequent rains during the whole summer, which invariably ended in extremely cool weather. Rain fell on six days in the month of May, nine days in June, eleven in July, seven in August, ten in September, and six in October up to the 21st. many of the rainstorms being accompanied with thunder and lightning.

In former years very many specimens of leaf hoppers and parasitic Hymenoptera were taken, but this season very few of the former, and I may say none of the latter. It was noted that exceptionally few insects were observed coming into the house in the evenings, in fact, only upon one occasion were they observed at all. Consequently the captures were small, numerically, as compared with what they might have been if the season had been warm and dry, as is usually the case.

The trap was usually put out at dusk, and taken in the following morning between five and seven o'clock. Oftentimes there would be nothing in the trap by 10.30 or 11.00 p.m., but in the morning almost invariably no matter how much appearances would indicate a blank, a number of things would be found.

All insects of the orders Lepidoptera, Coleoptera, Hemiptera, Hymenoptera and Diptera, except the numerous midges and phrygania flies, would be assorted out each evening following the evening of capture, and one specimen at least of each species pinned, and the number of duplicates of that species indicated on a card, together with the date of capture affixed on the pin and put away for future reference.

In the case of rare moths all specimens would be spread, as also one or two perfect specimens of the commoner species. 126 species have thus far been named and classified. Many of the microlepidoptera yet remain to be determined, as well as about 16 species of the noctuidæ, etc.

The following is a list of the captures, with the number of specimens of each species, and the range of the dates of capture. The numbers are after Dyar's List.

787 Scepsis fulvicollis, Hubner .... 2 sp., 28 August and 12 September.
798 Ctenucha virginica, Charp. .... 2 sp., 20 June and 26 July.
808 Hypoprepia fucosa, Hubner .... 1 sp., 6 August.
851 Estigmene acræa, Drury .... 4 sp., 12 June—14 July.

855 Hyphantria cunea, Drury ... ... 2 sp., 15 June—19 July.
859 Isia isabella, S. & A. .... 4 sp., 23 June—29 August.
860 Phragmatobia fulginosa, L. .... 2 sp., 19 July and 6 August.
862 Diacrisia virginica, Fab. .... 6 sp., 8 June—19 August.
874 Apantesis virgo, Linn. ... . 11 sp., 16 July—31 July.
878 Apantesis parthenice, Kirby. .... 1 sp., 4 September.
968 Raphia frater, Grote .... 3 sp., 14 July—2 August.
1032 Apatela distans, Grote .... 1 sp., 5 August.
1049*b* Arsilonche Henrici, Grote . .. 10 sp., 7 May—9 August.
1084 Catabena lineolata, Walk. .... 6 sp., 12 July—5 August.
1087 Crambodes talidiformis, Gn. .... 1 sp., 25 July.
1166 Hadena mactata, Gn. .... 1 sp., 6 September.
1208 Hadena basilinea, Fab. .... 1 sp., 18 June.
1219 Hadena suffusca, Morr. .... 1 sp., 1 July.
1227 Hadena dubitans, Walk. ... . 14 sp., 25 July—18 September.
1232 Hadena devastatrix, Brace .... 39 sp., 27 June—29 August.
1235 Hadena arctica, Boisd .... 8 sp., 7 July—3 August.
1241 Hadena verbascoides, Gn. .... 1 sp., 20 June.
1278 Hyppa xylinoides, Gn. .... 1 sp., 4 September.
1288 Euplexia lucipara, Linn. .... 3 sp., 7 June—15 July.
1295 Pyrophila pyramidoides, Gn. .... 3 sp., 9 September—12 September.
1297 Heliotropha reniformis, Grt. .... 1 sp., 5 September.
1422 Eueretagrotis sigmoides, Gn .... 2 sp., 12 July.
1423 Eueretagrotis perattenta, Gr .... 1 sp., 8 July.
1462 Peridroma occulta, Linn .... 1 sp., 15 August.
1478 Noctua bicarnea, Gn. ... . 3 sp., 30 July—9 August.
1481 Noctua c-nigrum, Linn. .... 1 sp., 6 October.
1490 Noctua plecta, Linn. .... 9 sp., 7 June—14 September.
1493 Noctua haruspica, Gr... .... 5 sp., 19 July—1 August.
1538 Feltia subgothica, Haw..... .... 15 sp., 6 August—19 September.
1540 Feltia jaculifera, Gn. .... 51 sp., 18 July—11 September.
1540*d* Feltia herilis, Gr. .... 33 sp., 3 August—4 September.
1545 Feltia venerabilis, Walk. ... . 6 sp., 12 September—20 September.
1549 Feltia volubilis, Harvey .... 1 sp., 23 June.
1552 Porosagrotis vetusta, Walk. .... 1 sp., 24 August.
1724 Paragrotis obeliscoides, Gn. ..... . 4 sp., 2 July—4 August.
1807 Mamestra picta, Harris .... 1 sp., 11 June.
1822 Mamestra legitima, Grt. .... 1 sp., 19 July.
1823 Mamestra lilacina, Harr. .... 1 sp., 13 June.
1829 Mamestra renigera, Stephens .... 4 sp., 20 June—2 August.
1842 Mamestra lorea, Gn. .... 14 sp., 18 June—9 July.
1950 Nephelodes minians, Gn. .... 93 sp., 24 August—18 September.
1957 Heliophila luteopallens, Smith..... ..161 sp., 6 June—5 October.
1963 Heliophila albilinea, Hubn.. ... ... 2 sp., 9 July—3 August.
1975 Heliophila insueta, Gn... .... 5 sp., 11 June—23 June.
1979 Heliophila commoides .... 3 sp., 7 July—8 September.
1980 Heliophila phragmatidicola, Gn. ... . 3 sp., 31 July—17 September.
1997 Orthodes cynica, Gn. .... 1 sp., 12 June.
2015 Graphiphora oviducta, Gn. .... 29 sp., 1 June—21 June.
2040 Graphiphora alia, Gn. .... 1 sp., 7 May.
2060 Tricholita signata, Walk. .... 3 sp., 2 August—6 August.
2149 Sphida obliqua, Walk. .... 1 sp., 14 June.
2162 Gortyna nictitans, Bork. .... 3 sp., 9 August—29 August.
2187 Papaipema cataphracta, Gr. ... . 8 sp., 18 September—5 October.
2192 Papaipema marginidens, Gn. ..... 2 sp., 17 September—19 September.
2199 Xanthia flavago, Fab .... 2 sp., 2 October and 5 October.
2203 Brotolomia iris, Gn. .... 1 sp., 6 June.
2207 Scoliopteryx libatrix, Linn. ..... . 1 sp., 1 July.
2222*a* Orthrosia ferruginoides, Gn..... .... 7 sp., 18 September and 19 October.
2430 Euthisanotia grata, Fab.... .... 5 sp., 11 July—3 August.
2474 Plusia ærea, Hubner ..... 3 sp., 19 June and 4 September.
2475 Plusia æroides, Gr .... 2 sp., 18 July and 2 August.
2476 Plusia balluca, Geyer ... ... 2 sp., 21 July and 30 July.
2479*a* Enchalcia Putnami, Gr . ... 1 sp., 29 August.
2483 Autographa bimaculata, Steph. ... . . 1 sp., 23 July.
2488 Autographa precatonis, Gn. ... ... 9 sp., 21 June—14 September.
2536 Abrostola urentis, Gn. .... 4 sp., 17 June—30 July.
2540 Ogdoconta cinereola, Gn . . .. 5 sp., 12 June—12 September.
2568 Rivula propinqualis, Gn. ... ... 32 sp., 6 July—5 October.

2604 Eustrotia concinnimacula, Gn. .... 2 sp., 7 June.
2607 Eustrotia muscoscula, Gn. .... 5 sp., 21 June—11 July.
2613 Eustrotia carneola, Gn. .... 36 sp., 1 June—12 September.
2682 Tarache cretata, G. and R. .... 15 sp., 6 June—17 September.
2691 Tarache candefacta, Hub. .... 9 sp., 13 June—21 July.
2734 Homopyralis contracta, Walk. .... 2 sp., 7 July and 12 July.
2754 Drasteria erechtea, Cramer .... 35 sp., 6 June—7 August.
2911 Euparthenos nubilis, Hub. .... 1 sp., 1 July.
3098 Datana ministra, Drury ... ... 1 sp., 15 June.
3142 Heterocampa bilineata, Pack ... . 1 sp., 6 June.
3149 Schizura concinna, S. and A. .... 1 sp., 2 August.
3166 Gluphisia septentrionalis, Walk... ..... 5 sp., 15 June—26 August.
3211 Tolype laricis, Fitch ..... 1 sp., 17 September.
3214 Malacosoma americana, Fab. ... . 5 sp., 11 July—20 July.
3238 Opheroptera boreata, Hub. .... 1 sp., 4 November.
3248 Endule mendica, Walk. .... 3 sp., 8 July—11 July.
3327 Eucymatoge intestinata, Gn. ..... 9 sp., 7 June—9 August.
3340 Hydria undulata, Linn. .... 1 sp., 11 July.
3348 Eustroma diversilineata, Hub. ..... 1 sp., 12 July.
3349 Eustroma testata, Linn. .... 2 sp., 5 September and 11 September.
3370 Peronoptilota fluviata, Hub... .... 2 sp., 14 July and 20 July.
3371 Mesoleuca ruficiliata, Gn. .... 1 sp., 25 July.
3374 Mesoleuca lacustrata, Gn. .... 8 sp., 28 May—19 July.
3376 Mesoleuca intermediata, Gn. ... . 13 sp., 7 May—9 August.
3402 Hydriomena latirupta, Walk. ... . 1 sp., 29 September.
3409 Hydriomena unangulata, Haw. ..... 1 sp., 15 June.
3419*a* Cœnocalpe cumatilis, G. and R. ..... 2 sp., 12 June and 19 June.
3438 Gypsochroa designata, Hub. .... 15 sp., 26 May—11 September.
3487 Synelys ennucleata, Gn. .... 2 sp., 18 July and 21 July.
3587 Aplodes mimosaria, Gn. .... 4 sp., 6 June—1 August.
3608 Orthofidonia vestaliata, Gn. .... 1 sp., 16 July.
3619 Gueneria basiaria, Walk. ... ... 2 sp., 18 June—8 July.
3623 Deilinia variolaria, Gn. ... ... 4 sp., 14 June—20 July.
3651 Sciagraphia heliothidata, Gn. ..... 1 sp., 6 August.
3662*a* Sciagraphia atrofasciata, Pack. ... . . 1 sp., 9 July.
3667 Philobia enotata, Gn. .... 1 sp., 19 June.
3690 Cymatophora ribearia, Fitch. ... . 2 sp., 22 July and 31 July.
3865 Lycia ursaria, Walk... .... 1 sp., 14 May.
3867 Lycia cognataria, Gn. .... 1 sp., 14 July.
3884 Erannis tiliaria, Harr. ... . 2 sp., 29 October.
3913 Metrocampa prægrandaria, Gn .... 1 sp., 5 September.
3923 Ennomos magnarius, Gn. ... ... 5 sp., 19 September—14 October.
3925 Xanthotype crocataria, Fab. .... 4 sp., 19 June—11 July.
3939 Ania limbata, Haworth .... 7 sp., 12 July—31 July.
3941 Gonodontis hypochraria, H. S. ... . 1 sp., 14 June.
3981 Metanema inatomaria, Gn. .... 2 sp., 8 June—16 July.
3982 Metanema determinata, Walk. ... . 2 sp., 19 July—27 July
4001 Azelina ancetaria, Hub. ... ... 3 sp., 7 August—28 August.
4007 Caberodes confusaria, Hub .... 1 sp., 11 July.
4011 Tetracis crocallata, Gn. ... . 2 sp., 7 June.
4026 Sabulodes transversata, Drury ... . 2 sp., 28 August.
4191 Bembecia marginata, Harr. .... 1 sp., 26 June.
4277 Desmia funeralis, Hub. .... 2 sp., 19 June and 16 July.
4336 Evergestis straminalis, Hub. ... ...348 sp., 1 June—18 September. 41 dates.
4487 Nymphula icciusalis, Walk. ... ... 4 sp., 9 July and 21 July.
4492 Nymphula badiusalis, Walk .... 16 sp., 9 July—12 September.
4521 Herculia olinalis, Gn. ... ... 5 sp., 9 July—19 July.
4545 Schænobius melinellus, Clem. ... ... 5 sp., 11 July—7 August.
4573 Crambus laqueatellus, Clem. ... ... 2 sp., 15 June—20 July.
4620 Argyria nivalis, Drury .... 47 sp., 1 July—11 September.
4622 Argyria auratella, Clem. ... ... 1 sp., 14 July.
5139 Eucosma Scudderiana, Clem... .... 1 sp., 19 June.
5331 Epagoge sulfureana, Clem. ... ... 9 sp., 9 July—19 September.
5661 Tricotaphe nonstrigella, Cham. ... . 1 sp., 18 September.

Of Coleoptera 60 species were taken at light, viz.:

Bombidium variegatum, Say. .... 1 sp., 18 July.
Bombidium sulcatum, Lec. .... 1 sp., 9 July.
Bombidium mimus, Lec. .... 1 sp., 11 July.

Amara lactor, Kirby.	6 sp., 11 July—5 August.
Amara sp.	1 sp., 12 July.
Platynus decorus, Say.	1 sp., 29 September.
Platynus carbo, Lec.	1 sp., 18 July.
Platynus placidus, Say.	7 sp., 9 July—31 July.
Lebia pleuritica, Lec.	1 sp., 25 September.
Lebia viridis, Say.	2 sp., 11 September.
Chlænius tricolor, Dej	1 sp., 18 July.
Agonoderus pallipes, Fab.	45 sp., 3 May—14 September.
Harpalus pennsylvanicus, Dej.	15 sp., 18 July—5 August.
Harpalus erythropus, Dej.	17 sp., 11 July—6 August.
Harpalus sp.	2 sp., 9 July.
Stenolophus ochropezus, Say.	5 sp., 21 June—11 July.
Acupalpus carus, Lec.	1 sp., 9 July.
Anisodactylus discoideus, Dej.	3 sp., 9 July—18 July.
Anisodactylus terminatus, Say.	7 sp., 16 July—29 August.
Ccelambus impressopunctatus, Sch.	1 sp., 9 July.
Helophorus lacustris, Lec.	1 sp., 19 July.
Hydrochus squamifer, Lec	2 sp., 16 July.
Hydrobius fuscipes, Linn.	4 sp., 16 July—6 August.
Cereyon prætextatum, Say.	1 sp., 30 July.
Trogophlœus memnonius, Ev.	1 sp., 16 July.
Staphylinidæ G. sp.	2 sp., 9 July and 30 August.
Psyllobora 20-maculata	2 sp., 2 August and 30 September.
Læmophlœus biguttatus, Say.	1 sp., 9 July.
Cryptophagus sp.	1 sp., 19 September.
Cœnoscelis ferruginea, Sahlb	1 sp., 16 July.
Tomarus sp.	1 sp., 30 September.
Epurœa labilis, Er.	7 sp., 6 June—19 July.
Melanophthalmus distinguenda, Com.	5 sp., 6 June—11 September.
Scirtes tibialis, Guer.	8 sp., 9 July—31 July.
Cyphon variabilis, Thunb.	14 sp., 9 July—30 September.
Melanotus fissilis, Say.	4 sp., 19 June—1 August.
Athous Brightwelli, Kirby	1 sp., 19 July.
Asaphes memnonius, Hbst.	5 sp., 12 July—6 August.
Throscus Chevrolati, Bony.	5 sp., 1 June—12 September.
Pedabrus sp.	3 sp., 18 June.
Podabrus sp.	1 sp., 15 June.
Hadrobregmus errans, Melsh	3 sp., 9 July—31 July.
Xyletinus peltatus, Harr.	2 sp., 16 July.
Copris anaglypticus, Say.	1 sp., 16 June.
Aphodius ruricola, Melsh	6 sp., 21 June—31 July.
Aphodius prodromus, Brahm.	1 sp., 11 October.
Serica vespertina, Gyll	3 sp., 6 June—18 July.
Serica sericea, Ill.	3 sp., 12 June—19 June.
Diplotaxis tristis, Kirby	1 sp., 14 May.
Lachnosterna fusca, Fröh.	1 sp., 7 June.
Lachnosterna dubia, Smith.	3 sp., 2 June—4 June.
Cithosoma brunneum, Forst.	1 sp., 5 August.
Saperda calcarata, Say.	1 sp., 31 July.
Strongylium tenuicolle, Say.	1 sp., 6 August.
Hymenorus niger, Melsh.	4 sp., 17 July—1 August.
Hymenorus sp.	1 sp., 6 August.
Canifa pallipes, Melsh.	5 sp., 6 June—18 July.
Anthicus scabriceps, Lec.	2 sp., 25 July.
Otiorhynchus ovatus, Linn.	5 sp., 19 July—29 August.
Tomicus pini, Say.	1 sp., 2 August.

Addenda.—The following Coleoptera have been kindly determined for me by Prof Wickham.

9923	Cryptophagus acutangulus, Gyll	1 sp., 8 May.
	Cryptophagus laticlavus, Casey	1 sp., 19 September.
	Atomaria (very near) oblongula, Casey	1 sp., 30 September.
3986	Ptilodactyla serricollis, Say.	1 sp., 19 June.
4882	Podabrus basillaris, Say.	3 sp., 18 June.
	Podabrus basillaris (var. flavicollis), Lec.	1 sp., 15 June.
	Hymenorus sp.	1 sp., 6 August.

The species of Hymenoptera, Hemiptera and Diptera have not yet been determined, the first named number 24 species, the second 25 species, including 20 of Leaf-hoppers and the last (Diptera) 27 species.

SPINNING METHODS OF TELEA POLYPHEMUS.

By J. W. Cockle, Kaslo, B. C.

After the publication of my letter on the above subject in the *Canadian Entomologist* of April last, I received several letters from correspondents bearing upon this subject, and in re-opening the discussion and adducing such data as I have been able to procure, I would touch upon reasons ascribed for the peculiarity displayed by the larvæ of this species in its different habitat.

In an article published by Mr. Wm. T. Davis, Journal of N. Y. Entomological Society, March, 1897, he gives as his reason for the suspension of the cocoon that it affords a protection from the attack of woodpeckers, and cites instances where he has found the contents of the pupa had been extracted through an opening made by these birds, and he thinks that the fact of allowing the cocoon to swing on the end of a twig affords great protection against attack from this source.

Another of my correspondents, Mr. F. M. Webster, also takes the same grounds as an explanation of this fact; to both of these querists I would suggest the consideration of the fact that larvæ of various sorts must, according to natural law, have been pre-existent to the woodpecker, and, whilst agreeing with them, that there are some grounds for their argument, I would seek a broader cause for the reason of suspension. The footnote of the Editor of *Canadian Entomologist*, in April, "that he had never seen a cocoon suspended as described and figured by the late Dr. Grote," confirms the observation of many eastern entomologists, and bears out the rule that dominates the habits of these larvæ in the east.

In order to have some practical demonstration of the habit of these larvæ I raised a small brood, and after they had passed the last moult they were liberated, without any restraint or protection, amongst a patch of brush, comprising a small birch (their food plant), a willow, and a Coeanothus with a good undergrowth of grasses and small evergreen shrubs.

28 larvæ were turned down, and in about four days they commenced to spin, occasional visits a few days apart for a further period of ten days found some of them still feeding, at the expiration of three weeks a search resulted in the discovery of twenty cocoons, the balance may be accounted for in having strayed off or being destroyed by birds; those recovered gave the following results:

Exhibit A. 3 cocoons. Found in grass under the food tree, encased in dried leaves, with the cocoon firmly attached to the ends of the grass stems which were bent and fastened with a lot of silk forming an arch, which would effectually keep the cocoon suspended off the ground when located under the protection of the overhanging boughs and brush. It will be noticed that some of the silk bands run down the grass stems for several inches.

Exhibit B. 14 cocoons. Firmly attached to the branch by a silken thong which is spun from the inside of the leaf along the leafstem, and thence extended completely round and along the branch.

Exhibit C. 1 cocoon. Silk spun up leaf stalk, but insecurely attached to branch, only two threads had been spun out to the normal distance, but the fact of the leafstem being completely surrounded with a casing of silk which extends up to the branch, shews an evident intention of securing it against falling.

Exhibit D. 2 cocoons. Spun between folded leaves without any apparent intention of securing them from falling.

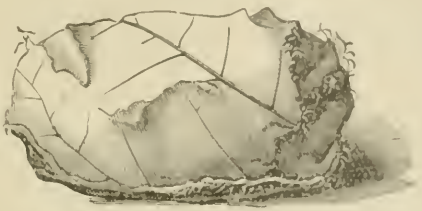


Fig. 12. Telea polyphemus cocoon spun between leaves.

The results thus obtained show that out of twenty cocoons, eighteen had in some way made provision against falling to the ground, and, whilst an inspection of the cocoons sent will shew that many of them are so firmly attached to the branch that a woodpecker would find little trouble in piercing them, yet, the characteristic protection of the group would seem to point to some other cause than that assigned by my correspondents, and after having seen the result of my experiments to determine whether the suspension was accidental or premeditated. I can only reiterate my suggestion in *Canadian Entomologist* of April last, that this protection is mainly against climatic change, and their consequent destruction by wet, and is governed by the local climatic conditions.

Exhibit E. 1 Imago. Emerged 22nd August, another emerged two days later.

In conclusion, I would draw your attention to the paragraph dealing with this species by Dr. H. G. Dyar, Proc. National Mus. Vol. xxvii, 1,376, page 792, in which Dr. H. G. Dyar characterizes this moth as having a tendency to a distinctly local race, and in addition to the variation in colour mentioned by him it may be added that the submarginal band on the primaries is almost straight, and not curved as in the case of eastern and southern specimens, the wing being more angular than the falcate form of the eastern States, but at the same time not being sufficiently different to warrant a varietal name.

INSECT NAMES AND INSECT LISTS.

By J. B. Williams, F.L.S., Toronto.

Some time ago the British Museum received a pair of giraffe skins from East Africa. They were mounted for the museum, and it became necessary to identify the exact variety of giraffe to which they belonged, so Dr. Lydekker wrote a paper revising the species and subspecies of giraffe all over Africa, "and without," he says, "any desire to add to the burden of zoological nomenclature," he came to the conclusion that the right scientific name of these museum specimens was *Giraffa camelopardalis Rothschildi;* or the "Baringo Giraffe."

It is all very well for a great creature of this kind to have a long name, but there is a quiet, harmless, little brown bird with a yellow spot over the eye, and on the bend of the wing, that builds its nest every summer among the grasses of our fields and meadows; and if you wish to speak of it scientifically you must call it *Ammodramus Sandwichensis savanna;* I allude to the Savanna Sparrow.

And worse, still, a western form of the little common blue butterfly is labelled *Lycæna pseudargiolus Arizonensis.* What has the little creature done to deserve such an awful title? These titles have 30 or 32 letters in them; some names of the small moths are even worse, and have 36 or 37 letters.

It is necessary to have some means of designating well defined varieties or subspecies, but the present method of adding a third word just like another specific name is awkward, and cumbersome; and, I may add, unscientific, for it uses as long a word to define small and unimportant differences as it does to indicate great and important ones. A number of names are thus occupied that might otherwise be employed for genera and species, and this is a serious thing, for species are now so numerous that suitable words of Greek or Latin origin that have not previously been used, are very hard to find. Mr. Taylor complains of this difficulty in the *Canadian Entomologist* for last month; and every year the difficulty increases.

The plan of naming varieties after the discoverer or his friends is one way of getting over the difficulty, but it is in many ways a very objectionable method. Some people like to see their names cut on the trunks of trees, or deeply engraven on the benches of a public park; but entomologists have a weakness for tacking them on to the title of some poor little bug or butterfly, and, possibly, the hope of being thus immortalized sometimes gives additional incentive to their zeal for uselessly multiplying subspecies and varieties, and thus piling up outlandish names that make, not only amateurs, but also many professional naturalists complain of the grievous heaviness of the burden.

Is there no possible relief from such a system? A great number of subspecies are merely geographical races, and might always be designated as Northern, Southern, Eastern or Western forms. For all these the first three letters of the Latin words—borealis, australis, orientalis and occidentalis might be affixed after the specific name; this would give us *bor., aus., ori. and occ.* as the mark of such varieties. In the same way Spring, Summer, Autumn or Winter forms could be designated by *ver., æst., aut.* and *hib,* respectively, and, as every one interested would soon know what such signs stood for, it would never be necessary to write the words in full. For certain varieties that could not be described by these marks a few others would, perhaps, be necessary. Differences in color, such as pale or dark forms, could be designated by *obs.* and *pal.,* or differences in pattern, such as streaked or spotted, could be shown by *lin.* or *mac.,* or where it was desirable to distinguish differences in size, such as small, middle sized, and large, parvus, medius, and magnus could be shown by *par., med.* and *mag.,* and *typ.* could be affixed to the species that was regarded as the typical form. Thus fourteen or fifteen marks of this kind would suffice for nearly all existing varieties, not only of insects, but also, probably, of birds and mammals, and even if they had to be increased to twenty-four, or twenty-five, there would be no great difficulty in remembering that number. Dr. Fletcher's little Thecla would become *Thecla strigosa occ.,* and the two forms of G. comma would be *G. comma æst.,* and *G. comma aut.* This would be a shorter and more compact method than the present one, and as

the signs do not spell real words they could not be mistaken for anything else.

There would then be a marked difference between the specific and subspecific designations, and the one that marks only slight variations would not appear very important, nor could it be used alone, but only in connection with the specific name. The dislike of trinomials has led some naturalists to maintain certain forms as species, which ought to have only subspecific rank; if some short and simple method, such as this, were in use these species would soon be relegated to their right position, and the number of species be materially reduced. There has been, sometimes, almost a craze for the discovery of new species, and to gratify it small and unimportant differences have been unduly magnified.

There is an amusing and satirical passage in one of Mr. Ruskin's lectures to the students at Oxford, which we would still do well to bear in mind when we are tempted to devote too much time and energy to the detecting of slight differences. He was speaking of birds, but the same principle applies to all branches of zoology. "None of you," he says, "could have much hope of shooting a bird in England which would be strange to any master of the science, or of shooting one anywhere which would not fall under some species already described. And although at the risk of life, and by the devotion of many years to observation, some of you might hope to bring home to our museum a titmouse with a spot on its tail which had never before been seen, I strongly advise you not to allow your studies to be disturbed by so dazzling a hope, nor your life exclusively devoted even to so important an object."

This Society has, I believe, officially recommended its members to adopt the nomenclature of Dyar's List of the Lepidoptera; but for identifying species, I suppose many of us find Holland's books much more helpful and useful, on account of the splendid illustrations, but to get Holland's names, and then try to identify them with those in Dyar's List, is a work that has a tendency, at times, to nearly drive one frantic.

Then for general reference, when you want to see at a glance the position and relationship of the different genera, a condensed list like J. B. Smith's is very much more convenient than a voluminous one like Dyar's, and, as he is very conservative of the old names, its use does not necessitate the entire relabelling of a collection. Even Holland has left the old paths in his arrangement of the Sphingidæ, and has followed the revolutionary scheme of Rothschild and Jordan; though after preparing his plates for the old way, it seems a pity to have changed the letter press at the last moment; indeed, the opposition in order of the plates and the letter press causes a good deal of irritation to the reader.

All this confusion, of course, arises very largely from a persistent application, without any discrimination or consideration of the great *Law of Priority*, which, like other good things, is good in moderation, and tends to secure a fixed and permanent nomenclature, but carried to an extreme it defeats its own ends, and often produces an opposite result. If, whenever any obscure old author is found to have suggested a name for a species, which, perhaps, no one else ever adopted, a few days even before the usually accepted name came into use, everything must be changed to carry out the Law of Priority to its bitter end; why the Law becomes a curse instead of a blessing. There are many instances just like this where for seventy or eighty years every writer has used a certain name, but because some old fogey, two or three years before, suggested something else, the time honored and familiar appellation is all swept away, and confusion and irritation reign in its place.

It is very well to apply such a law to recent names, or where several titles have been equally in use for some time, but to make it binding in every instance, seems absurd, and is a method that we should never think of adopting in the ordinary affairs of life. Mr. Lyman suggested in his presidential address, a few years ago, the formation of an Entomologists' Union, that should bring out an authoritative Insect List; there are, I suppose, many difficulties in the way of such an undertaking. It would, however, be a great convenience if we had a list of Canadian Lepidoptera—a work which this Society might very well undertake—so that beginners would not have to wade through page after page of irrelevant matter when seeking information about our own species.

It might be formed on the general plan of Dyar's List, and, according to his nomenclature, if that was thought desirable, but the old names of genera should be placed in brackets beside the new ones where changes have been made, and the geographical range of each species, and time of appearing, given as far as possible.

The Montreal branch had, at one time, something of this kind in view, and prepared some material for it, I believe. And if some method of indicating subspecies, as here proposed, could be adopted in such a publication, it would recommend itself to many, I think, as a partial deliverance from the grievous burden of scientific nomenclature.

NOTES ON THE SEASON OF 1904, (WESTERN QUEBEC).

By Charles Stevenson, Montreal, Que.

The agriculturists of this district have been little troubled by insect pests. The potato beetle, *Leptinstarsa* (*Doryphora*) *decemlineata* Say, has not been troublesome. The Tent caterpillars *Malacosoma Americana*, Hub, and the Tentles *M. disstria*, Hub., have been scarce. Some colonies of the former were seen at St. Hilaire, which had practically destroyed some young and isolated apple-trees, but there were no signs of attack on the old trees, thanks to the excellent care taken of the orchards and the application of insecticides. The common Tussock-moth caterpillars *Hemerocampa leucostigma*, S. and A., continue to increase on the shade trees of Montreal and throughout the district. The caterpillars of *H. definita*, Pack. were more prominent this year.

The *Rhopalocera* usually found in this district were more abundant than last year, except *Anosia plexippus*, Linn, which still remains conspicuous by its scarcity. *Enodia portlandia*, Fab., has been taken several times on Montreal Island in the month of August.

The flight of *Heterocera* was more interesting in the numerous species found in comparison to the quantity of specimens on the wing, thus making collecting at light more enjoyable. The most attractive catch was, probably, that of a specimen of *Erebus odora*, Linn, on the 13th September on Cadieux Street, Montreal. That beautiful moth *Euclea delphinii*, Bois, was taken on the 18th July, and the attractive geometer *Euchlaena serrata* Drury, on the 11th May. *Tolype velleda*, Stoll, was very abundant at light from the 14th to 16th September, and there was a veritable plague of *Ennomos magnarius*, Gn., in all varieties of markings on the 26th September, with practically nothing else flying.

The collectors of Coleoptera have worked hard this season, and obtained good results. A patch of Elder bushes *Sambucus Canadensis*, Linn, at Cote St. Paul were swarming with our beautiful longhorn beetle, *Desmocerus*

palliatus, Forst, during the second week of July. Six specimens of *Obrium rubrum*, Newm., were taken on the Boucherville Islands on the 25th July. *Cicindela scutellaris* var. *rugifrons*, Dej., was taken near Longueuil on the 3rd August. This is an interesting capture, as it has not been previously reported north of Massachusetts. Other interesting captures were:

Thermonectes basilaris, Harr, Montreal, 16 July.
Buprestis femorata, Fab, Montreal, 9 July.
Leptura nitens, Forst, Longueuil, 24 July.
Hoplosia nubila Lec., at light, Montreal, 18 July.
Graphisurus fasciatus, DeG., Montreal, 8 June.
Donacia pubescens, Lec., St. Hilaire, 1 July.
Chrysomela pnirsa, Stol, St. Hilaire, 24 July.

Nacerdes melanura Linn. This is an introduced species, and was extremely common about the wharfs and warehouses of Montreal during June and July. A few specimens were also found on the sidewalks uptown and in Longueuil.

Aphodius erraticus Linn. Another European beetle, two specimens were found for the first time in Canada at Maplewood, near Montreal, by Master K. R. Stevenson, on the 1st May. (*Can. Ent.* xxxvi. 164).

In the *Diptera*, the most interesting capture was two specimens of *Pterodontia flavipes* Gray, a large fly with a very small head, on the Boucherville Islands 25 July.

In the *Orthoptera*, two specimens of Panchlora *viridis* Burm. of the Blattidae or "Roaches" were captured, evidently introduced in some cargo of fruit.

INSECTS AFFECTING THE OAK.*

By the Rev. Thomas W. Fyles, D.C.L., F.L.S.

The oak is one of the lords of the forest. It is a stately, handsome and long-lived tree. Its wide-spreading branches make a grateful shade; its rich foliage is pleasant to the eye; its timber is valuable for a variety of purposes. In former days it was more largely used than it is now. The "wooden walls of old England," the mighty "three-deckers," were built of it. The forest of Dean in Gloucestershire supplied the trees. It was used also for the frames and wainscotting of houses; and oak furniture was highly prized.

The oak is not a common tree in the neighborhood of Quebec; and in the eastern townships it is seldom met with; but in Ontario it is more frequently seen.

Unfortunately, this handsome tree is much troubled with insect pests—perhaps more so than all our other hardwood trees put together.

Many an interesting and instructive volume might be written on the oak tree, and its inhabitants. In a paper, such as I have to read to you, I can only tell of some of the most remarkable of the frequenters of the oak.

*Read before the Quebec branch of the Ent. Soc. of Ont.

First, then, there is the broad-necked Sawyer, (*Prionus laticollis*, Dru). Fig. 13. I have not met with this in Quebec, but I have seen a specimen that was taken near Sherbrooke. This fine beetle is two inches long, and broad in proportion. Its larva feeds on the roots of the tree.

Boring in the trunk is the carpenter worm—the larva of the fine moth *Prionoxystus robiniæ*, Peck. This caterpillar is nearly three inches long. It has a livid, reddish body, and a glossy black head. It makes a tunnel as large as the bore of a half-inch auger. When nearing perfection it works its way to the surface of the wood, and prepares a way of exit for the future moth. It then retires about three inches, and spins a cocoon, in which it undergoes the pupal change. In due time the pupa breaks from its cocoon, works its way to the opening made by the caterpillar, and allows the moth to escape. The moth appears in June and July. This species tunnels in the locust tree (*Robinia pseudacacia*, L.,) as well as in the oak, and from this it derives its specific name, *robiniae*.

Fig. 13.

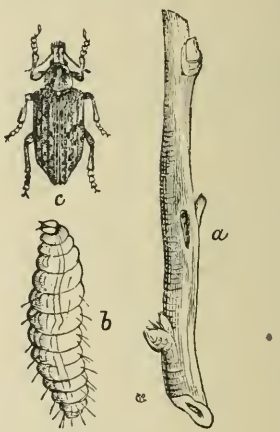


Fig. 14.

Mr. Albert F. Winn, of Westmount, P. Que., has found upon oak trees on Mount Royal specimens of the fine moth, *Prionoxystus Macmurtrei* Guerin-Méneville. The larva of this species is known as "The Lesser Oak Carpenter Worm."

A great variety of beetle-grubs are miners in the oak, and are very injurious to it, *Buprestidæ*, *Curculionidæ*, *Cerambycidæ*, *Scolytidæ*, *etc.*

The specimen I exhibit is *Urographis fasciatus*, De Geer, one of the Cerambycidæ. The species to which it belongs is found throughout the United States and Canada. Notice the long ovipositor of the female insect. With this she pierces the outer layers of the bark of the oak, that she may deposit her eggs in the softer layers within.

The larvæ tunnel in the bark close to the white wood, and pack their passageways so full of fine frass that it is hard to trace them. The beetles appear early in June. The larvæ and pupae should be looked for early in the spring.

It may have been to this beetle that the damage we noticed to the oaks in the grounds of Mr. Wade at New Liverpool, two or three years ago, was due.

Another injurious beetle is *Ithycerus noveboracensis*, Forster. This is the largest of our weevils or curculios. (Fig. 14*c*.). The female gnaws a small opening in a branch of the oak, (Fig. 14*a*), and then deposits an egg in it. The larva (Fig. 14*b*.) burrows in the twigs.

Among the interesting things that affect the oak are the *Cynipidæ*. You will remember that on one of our field days we visited the country-house of our friends, Mr. and Mrs. Morgan, on the Island of Orleans; and that our attention was drawn to the woolly galls upon the oak trees around it, and to the curious beetles, *Balaninus rectus*, Say, that we shook in such numbers from the branches.

Galls of the kind mentioned are formed by the four-winged fly, *Callirhytis seminator*, Harris. They are polythalamous, each being made up of distinct cells with flocculent matter attached. The flies that come from them differ in the sexes. The males are shining black, with tawny yellow legs and antennæ; the females have the head and thorax cinnamon red.

A remarkable gall that I have found on oaks, near Montreal, is that of *Amphibolips inanis*, O. S. It is produced on the red oak, and comes to maturity in June. When opened at this time it is found to consist of a mere shell with a central chamber, held in place by radiating filaments. The fly makes its way from this central chamber, bites a round hole in the outer rind, and so escapes.

A variety of larvæ, both of moths and butterflies, feed upon the leaves of the oak. The most injurious of these is the Forest Tent-caterpillar, the larva of *Clisiocampa disstria*, Hbn., (Fig. 15.,) which spins a cob-web like

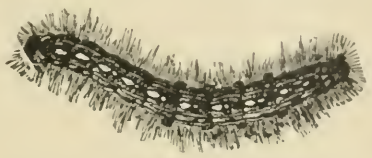


Fig. 15. Forest Tent-caterpillar.

nest against the sides of the tree, and swarms along the branches, stripping them of their foliage.

This caterpillar must not be confounded with that of the *Clisiocampa Americana*, Fabr., of the orchard. It differs from it in several respects. One of these is easily remembered. The larva of *C. disstria* has a row of white spots along the back, that of *C. Americana* has a white stripe.

The largest larvæ that sometimes feed on the oak are those of the handsome Saturnian, *Attacus Cecropia*, Lin, and the no less handsome *Telea Polyphemus*, Cram., beautiful larvæ feeding on the oak, and well worthy of observation are those of:

Anisota pellucida, Hubner.
Halisidota tessellaris, A. and S.
Halisidota maculata, Harr.
Edema albifrons, A. and S.

Several kinds of oak-feeding larvæ are stingers:

Hemileuca maia, Drury.
Lagoa crispata, Pack.
Phobetron pithecium, A. and S.
Sibine stimulea, Clem.

Of these the only one I have found at Quebec is *Phobetron pithecium*, the 8-flapped slug-worm.

Of butterfly larvæ that are found on the oak, these may be mentioned:

Limenitis disippus, Godt.
Thecla calanus, Hbn.
Nisoniades brizo Bois., Lec., and occasionally *Papilio turnus*, Linn.

These are all found in the neighborhood of Quebec.

With brief accounts of two diminutive moths that frequent the oak I must bring this paper to a close.

A few seasons ago I found on the oaks growing on the Rhodes estate at Bergerville great numbers of the caterpillars of the beautiful little Tortrix, *Cacœcia fervidana*, Clem. The caterpillar of this species is brownish buff, and has a dark brown head. When disturbed it lets itself down by a thread, dangling at the end of it spider-wise. It gathers several leaves together and binds them with silken threads. Within the nest so formed it makes itself a silken case—feeding from it upon the pulpy portions of the leaves. And in this case it undergoes the change to the chrysalis.

The moth is a pretty little object with reddish brown fore-wings, much clouded with fuscous and marked with several brown patches. The hind wings are very dark. The fringes are pale.

The other moth—the last I shall mention—is a miner, *Lithocolletes hamadryadella*, Clem. Its larva forms whitish blotches in the leaves, for it feeds between the upper and lower skins of the leaf. Sometimes four or five of these blotches will be found in one leaf. The tiny caterpillar is brownish yellow, flat, footless, but very active. When full fed it goes into chrysalis within its mine. The moth is a brilliant little object with white fore-wings, having bronze bands with black borders on the inner side. The hind wings are silvery. It is one of the numberless minute things in nature that glorify God by bearing witness before men of His almighty power.

ON THE FOOD HABITS OF CERTAIN OF THE HYMENOPTERA.

(Paper No. II.).

By Rev. Thomas W. Fyles, D.C.L., F.L.S., Levis, Quebec.

Gall-Inhabiting Hymenopetra.

Galls are abnormal growths upon various parts of plants, resulting from the operations of insects of different kinds, every kind of insect agent producing its own peculiar gall. But here it must be observed that the insects found in galls are not, in all cases, the producers of them; they may be intruders, either hurtful or harmless, upon the domains of others.

The insects belonging to the Hymenoptera that are found in galls may thus be grouped:

A—Gall producers.
  a—Solitary.
  b—Social.
B—Gall invaders.
  a—Feeding upon the substance of the gall.
  b—Preying upon the producers of the gall, or their guests.

A, *a*—Of galls produced by Hymenopterous insects, the kind found upon the leaves of the White Willow (*Salix alba, L.*) is so abundant and conspicuous that even the least observant dweller in the country, having a knowledge of the tree and the use of his eyes, will readily call the galls to mind. They are produced by a small Saw-fly.

The White Willow is not indigenous to this country; it was introduced from Europe, and the saw-fly was, probably, introduced with it. In 1885 I submitted specimens of our Canadian insect and its galls to Mr. Edward

A. Fitch, of Maldon, England, and he wrote, "The saw-fly I have but little doubt is identical with our British *Nematus gallicola*, Westw. (*callimeni*, Hart.) as far as I can judge from the female and gall sent."

The female insect makes a slight wound in the leaf, and then deposits an egg in the wound. It may repeat the process a number of times on the same leaf. Around the egg the gall begins to form, and it soon becomes a stronghold and storehouse for the larva that is hatched from the egg.

What a strange existence is led by this larva! It is unacquainted with its kind; its knows nothing of its future; it abides in its "assigned and native dwelling place." Its sole occupation is eating away the walls of its cell, as they thicken around it, and making room for its own growth. It obeys a blind instinct; and so it spends the summer. In the autumn it is carried in the leaf to the ground, or, if the leaves be unusually persistent, it bites its way out of the gall and drops to the ground. In either case, having vacated its cell, it creeps into the soil, and there spins itself a close, brown cocoon of the size of a grain of wheat, and in this it abides, changing to a pupa about the close of the winter. In spring the perfect flies appear.

At one period of its existence this insect is liable to the attacks of a very formidable foe, the house sparrow.

From my study window I can see three large willows standing in my yard, and several times, at the close of summer, I have observed flocks of sparrows busily engaged in cracking the Nematus galls with their bills, and picking out the larvæ.

I do not think this Nematus does any harm to the tree, and the kidney-shaped, rosy-tinted galls are, rather than not, an embellishment to the leaves.

A, *b*, The Bedeguar of the Rose, or, as the children in England call it, Poor Robin's Pincushion, affords an example of a gall community. It is formed by a cynips, *Rhodites rosæ*, L. It consists of a number of cells closely united and tufted with numerous branched filaments, which serve the inhabitants of the galls as a protection from the winter's cold, and also, it may be, against the attacks of feathered enemies.

I do not find this gall around Quebec; but, some years ago, I found a number of them upon wild rose bushes growing in a pasture at the foot of Yamaska Mountain, on a farm that belonged to the late Rev. Canon Robinson; and I was able to raise the gall-fly from them in considerable numbers.

Another interesting example of these polythalamous galls is that of *Callirhytis seminator*, Harris. This pretty insect lays its eggs in the wounds it makes around the twigs of the white oak. The galls develop into a flocculent mass, imbedded in which the larval cells may be found. The perfect insects appear in the end of July. Galls of this kind are, in some seasons, abundant on the Island of Orleans.

B, *a*, I have often found upon the Canadian Blueberry (*Vaccinium Canadense*, Kalm), a very pretty gall of the size of a cherry, and of a rosy hue. The maker of this, *Solenozopheria vaccinii* was described by Mr. Ashmead in 1887 (Trans. Am. Ent. Soc. XIV., p. 149). I have never raised it; but I have obtained from the galls a species of guest-fly, *Megarismus nubilipennis*, Ashmead, in considerable numbers. A cross cut of a gall will shew the cells of this parasite in orderly arrangement. The

larvæ found in the cells are white and plump, and waxen in appearance, and have sharp mandibles. They are liable to attacks from predaceous secondary parasites. (Fig. 16).

B, *b*. There is a two-winged fly (*Trypeta solidaginis*, Fitch), which forms a large, round, pithy gall in the stems of the Golden Rod (*Solidago Canadensis*, L.). The larva has its cell in the centre of the gall, but bites

Fig. 16. *a*. Gall on Blueberry. Natural size. *b*. Section of Gall, showing cells of Guest-fly. Natural size. *c*. Larva of Guest-fly. Greatly enlarged.

a passage to the outer rind. Through this passage, probably, an insidious foe finds its way, viz., *Eurytoma gigantea*, Walsh. I gave a minute description of this species, both of the male and of the female, in the *Canadian Entomologist*, vol. xxvi., p. 122.

The country naturalist, who takes the trouble to study the plant galls and their inhabitants, finds many things to awaken his interest and to excite his admiration.

AN ELEMENTARY STUDY OF INSECTS.

By Prof. W. Lochhead, Guelph.

The late Prof. C. V. Riley, of Washington, estimated the number of kinds of insects on the earth at ten millions. Of this immense number only 200,000 are known, yet these make up two-thirds of all the kinds of animals known. The question will naturally arise: In what way do insects differ from other animals? Although they differ much among themselves, all in-

sects are seen to have much in common when their structure is studied. They all have, when full grown, three pairs of jointed legs; their bodies are composed of rings, or segments, more or less closely joined together into three re-

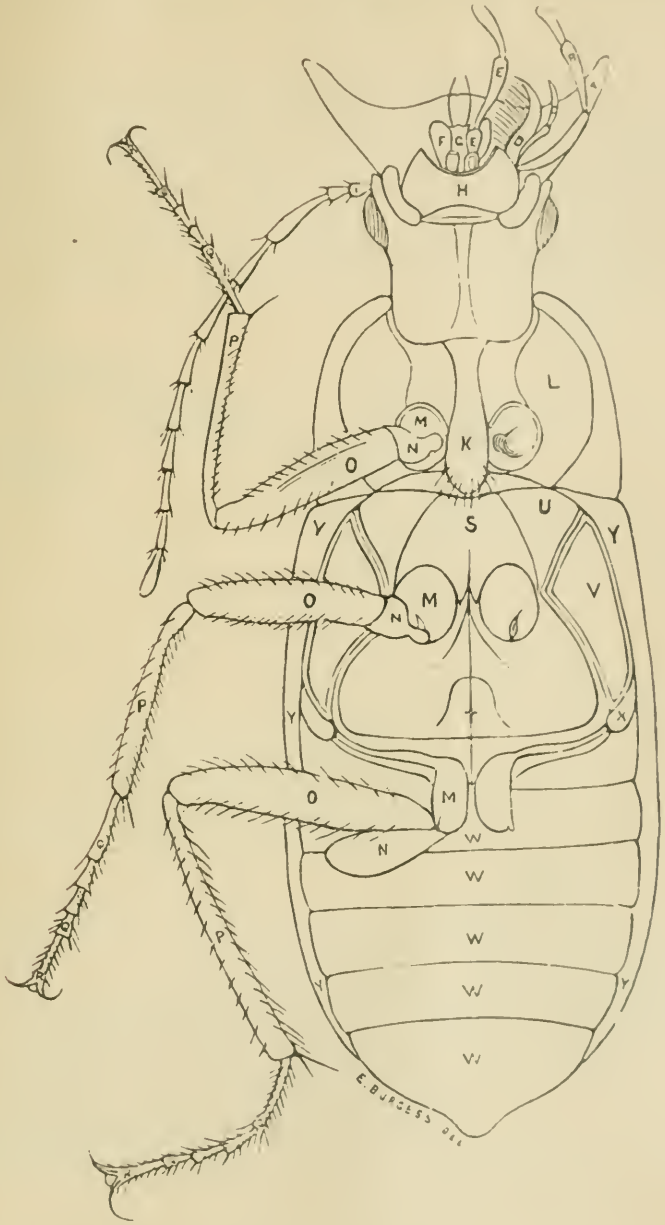


FIG. 17. Diagram of the underside of a Beetle (*Harpalus Caliginosus*); A. Mandible; B. Maxillary palpus; C. outer tube of Maxilla; D. inner tube of Maxilla; E. labial palpus; F. paraglossæ; G. Ligula; H. mentum; I. antenna; K. prosternum; L. episternum of prothorax; M. coxæ; N. trochanter; O. femur; P. tibia; Q. tarsus; R. claws (unguis); S. mesosternum; T. metasternum; U. episternum of mesothorax; V. espisternum of metathorax; W. ventral segments; X. epimeron of mesothorax; Y. epipleuron.

gions, head, thorax, and abdomen; they breathe air; they have one pair of feelers, or antennae; and usually one or two pairs of wings. By these characters, insects are readily distinguished from true worms, or from spiders, centipedes, and cray-fish, their near relatives.

The Head. The head bears the feelers or antennae, the eyes, and the mouth-parts, and is concerned with the *sensation of touch* and the *getting of food.*

The *feelers* function as organs of touch and perhaps of taste, and are very varied in shape. The *eyes* are compound and are composed of a large number of simple eyes. The *mouth-parts* are very unlike in different insects. In those insects which feed by chewing or biting their food, there are an upper lip, the *labrum;* a pair of jaws, the *mandibles,* which work sideways; a pair of smaller jaws, with feelers, the *maxillæ;* and a lower lip, the *labium* (Fig. 17). In those which take up fluid food, the mouth-parts are modified for sucking (Fig. 18), licking or piercing (Fig. 19). To combat injurious

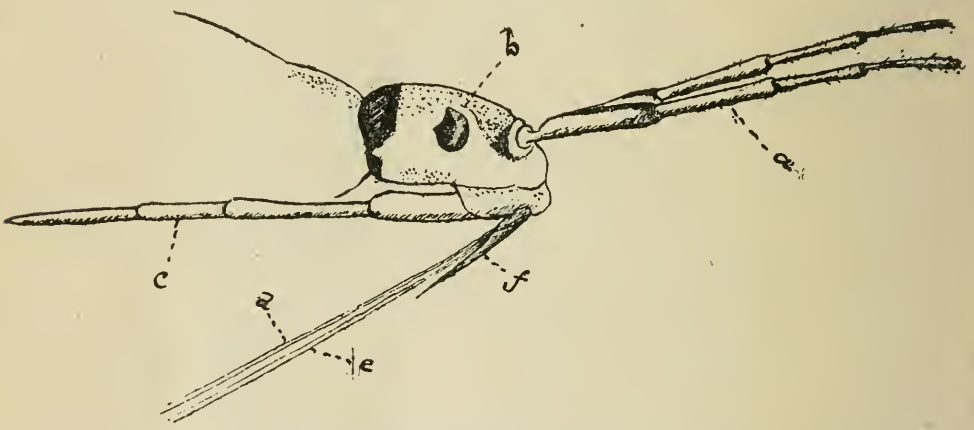


FIG. 18. Head of a sucking insect (Squash bug); *a* antennæ; *b* the eye; *c* the 4-jointed beak; *d* and *e* the four lances; *f* the labrum, (original).

insects successfully, the farmer or gardener should be able to tell biting forms from sucking forms, for it is possible to poison the food of the former, but not that of the latter.

The Thorax. The thorax is composed of three united segments. The first bears a pair of legs, while the second and third bear not only a pair of legs, but also often a pair of wings. It is clear that this region of the body is concerned with *movement.* (Fig. 20).

The legs of insects are jointed, and are composed of the following parts: The *coxa,* or hip; the *trochanter;* the *femur,* or thigh; the *tibia,* or shank; and the *tarsus,* a three to five jointed foot ending in claws. (Fig. 17).

The Abdomen. The abdomen is composed of many segments without limbs in adults; but in the young state, some insects, such as, butterflies, moths, saw-flies, there are *unjointed* feet, or *pro-legs,* on the abdomen. (Fig. 21). The organs of reproduction and digestion are situated within the abdomen.

The *alimentary canal* occupies the middle portion of the body, and is composed of *gullet, crop, gizzard, stomach,* and *intestine.* The crop may be called the storing stomach, and the gizzard the grinding stomach. Digestion takes place in the true stomach, into which the coecal tubes empty their secretions. With most sucking insects, however, the gizzard is wanting.

The *nervous system* lies below the alimentary canal, and close to the lower body wall. It is composed of a series of *ganglia* connected by two long, slender cords. The ganglia in the head is the largest, and supplies nerves to the eyes, feelers, and mouth. In general, each segment of the body has a ganglion which sends off nerves in all directions, to supply the segment.

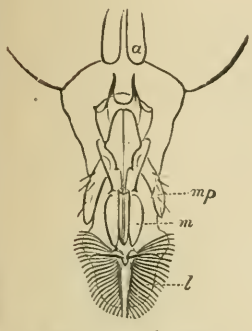


Fig. 18. Mouth parts of a House-fly.

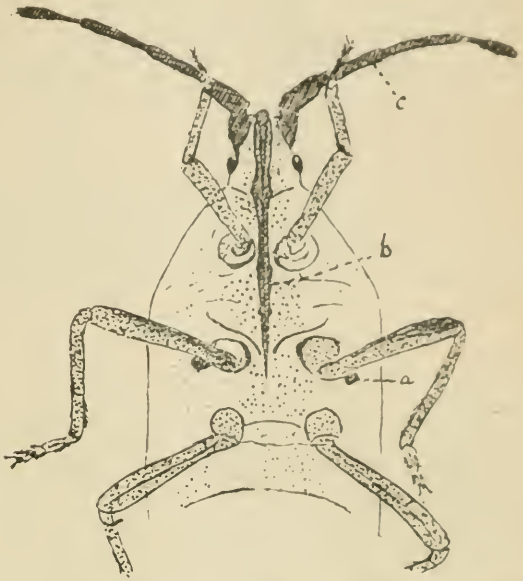


Fig. 20. Under surface of Head and Thorax of a Squash bug; *a* the odour glands; *b* the sucking beak; *c* the antennæ. (Original).

The *respiratory system* is clearly shown in Fig. 22. The breathing-pores, or *spiracles*, are valve-like openings lying along each side, and open almost directly into a tube which runs lengthwise of the body. From these

Fig. 21. Caterpillar showing pro-legs as well as feet.

two main tubes branches run in all directions through the body to the main organs. In many insects there are bulb-like expansions which act as air-reservoirs. By means of the system of tubes, or tracheæ, air is carried to all portions of the body, and the blood is rapidly purified by exchanging carbon-

dioxide for oxygen. In the case of sucking insects, the most effective way of killing them is to suffocate them by clogging the spiracles with such substances as tobacco, soap solution, kerosene emulsion, insect powder, lime, or dust.

The *blood*, which is nearly colorless, flows free within the cavity of the cavity of the body, and bathes the various organs. The requisite amount of oxygen is obtained by exchange from the tracheæ which contain air.

Reproduction and Metamorphosis. Most insects lay eggs, but a few bring forth living young. As a rule, insects have great powers of reproduction, but seldom are the newly hatched insects exactly like the adults. In

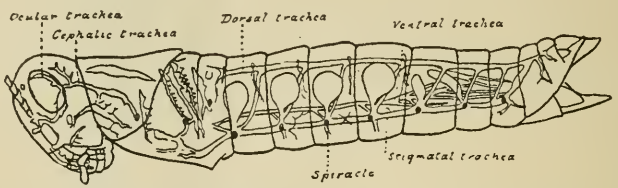


Fig. 22. Respiratory system of Grasshopper (after Hyatt).

fact, most insects pass through a more or less marked change during their lives. This is known as *Metamorphosis*, which is said to be *complete* (Fig. 23), when the insect passes through a stage of almost total rest, takes no food, and moves but little; and *incomplete* (Fig 24), when the insect does not pass through a stage of rest, but feeds and changes its form gradually with every moult, becoming more and more like the adult. As insects grow they cast off their old skin at intervals. The new skin is soft and elastic, but as it gets older, it becomes hard and inelastic. This is stripped off and replaced

Fig. 23. Complete metamorphosis; *a* caterpillar; *b* chrysalis in a cocoon; *c* moth.

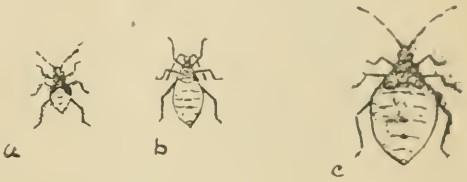
by a new one. By this *moulting*, growth is not interfered with. Among these insects which undergo complete metamorphosis are: Butterflies, moths, beetles, bees and wasps and flies. The different stages are known as *egg, larva, pupa, and adult.* The larval stage of insects is the most important one from an economic standpoint, for it is the feeding stage, and it is then that vegetation is injured. The larvæ of butterflies and moths are known as *caterpillars* (Fig. 21), and have usually 8 pairs of legs, sometimes only 5 pairs; those of saw-flies have usually 10 pairs of legs.

Grubs are the larvæ of beetles (Fig. 25), and have commonly only three pairs of legs. *Maggots* are the larvæ of flies (Fig. 26), bees and wasps, and are footless.

Fig. 24. Incomplete metamorphosis of a Cockroach; *a*, *b*, *c*, *d*, young larvæ; *e*, *f*, *h*, winged adults; *g* eggmass, magnified.

The grasshoppers, crickets, and bugs (Fig 27), undergo incomplete metamorphosis, so that the young resembles the adult, and becomes more like the adult with each succeeding moult.

Fig. 25. Grub of beetle.



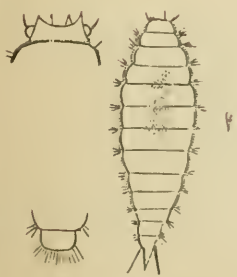


Fig. 26. Maggot of a Wheat midge.

Fig. 27. Development of a Squash-bug from a young individual to an adult.

Although the pupa stage is inactive, nevertheless it breathes slightly, and uses up some of the food which is stored in the body as *fat-bodies* during the larval stage. Some pupæ are naked (Fig. 28), and others are surrounded by a *cocoon* (Fig. 29), or web, which is spun by the larva. All pupæ, however, are invested in a more or less tight-fitting case. With some, the case covers the body loosely, but in others, the outlines of every external structure are clearly shown.

Life History: The life-history of an insect means simply the *life story*, that is, "all the changes it goes through, and all that it does from the time it hatches from the egg, or is born, until it dies of old age." It becomes an important matter to learn the whole life story when we wish to combat injurious insects, for very frequently there is a stage (not always the same stage for all insects), when they are most easily attacked and destroyed.

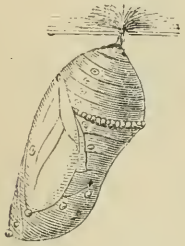


Fig. 28. Pupa of an Archippus butterfly.

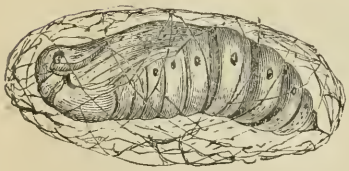


Fig. 29. Pupa in a cocoon.

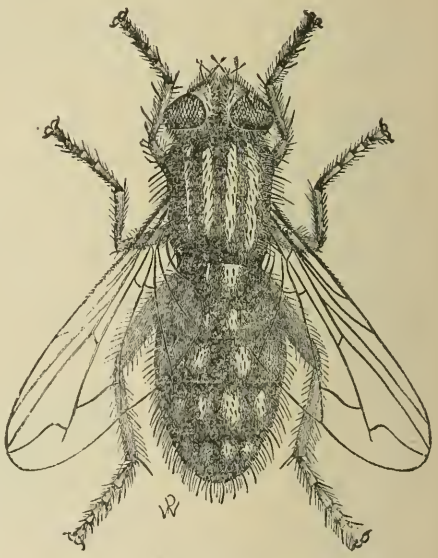


Fig. 30. Two-winged fly (Diptera).

Classification of Insects. Insects are, for convenience of study, divided into *Orders*, named according to the nature and number of the wings. Only seven orders will be discussed here, as nearly every insect of economic importance belongs to one of the seven:

1. With two wings .....*Diptera*. (Fig. 30).
2. With four wings:
   - A. Upper and lower wings similar in texture.
     - a. All wings scaly..... *Lepidoptera*. (Fig. 31, 32).
     - b. All wings naked or a little hairy:
       - (1) Wings many veined ....*Neuroptera*. (Fig. 33).
       - (2) Wings few veined ....*Hymenoptera*. (Fig. 34)
   - B. Upper and lower wings unlike in texture.

(a) Mouth-parts formed for sucking...*Hemiptera, Heteroptera*, (Figs. 19 and 20).

(b) Mouth-parts formed for biting:
(1) Upper wings horny.....*Coleoptera.* (Fig. 35).
(2) Upper wings parchment-like ...*Orthoptera,* Fig. 36).

Fig. 31. Butterfly (Lepidoptera)

When both the mouth-parts and the wings are used for classification the following may be used:

Fig. 32. Moth (Lepidoptera)

Fig. 33. Dragon-fly (Neuroptera)

1. Insects with both a biting and sucking mouth and wings with but few veins..... ... . *Hymenoptera.*

Fig. 34. Wasp (Hymenoptera)

Fig. 35. Beetle (Coleoptera)

2. Insects with a biting mouth:
A. Upper wings horny..... .... *Coleoptera.*

B. Upper wings parchment-like .....*Orthoptera.*
C. Upper wings with many veins..... .....*Neuroptera.*

3. Insects with a sucking mouth:
A. All wings scaly ....*Lepidoptera.*
B. Only two wings..... ... .*Diptera.*
C. Upper wings half leathery and half membranous

The Hymenoptera contain many beneficial forms, and some injurious forms. The metamorphosis is complete. They are often divided into the *stinging* species, such as bees, wasps, digger-wasps, ants, etc.; and the *piercing species*, such as Ichneumon flies (Fig. 39), Chalcid-flies, Gall-flies, Saw-flies (Fig. 40), and Horn-tails.

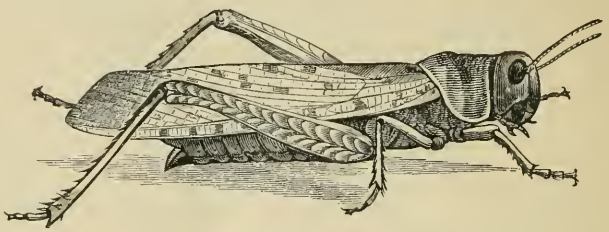


Fig. 36. Grasshopper (Orthoptera)

The *Coleoptera* or the *Beetles* are divided into the *True Beetles*, and the *Snout Beetles*. The True Beetles are again divided according to their *tarsi* and *antennæ* into: —

1. *Carnivorous* beetles with thread-like antennæ, and nearly all are beneficial. Such are the Tiger-beetles (Fig. 41), and the Ground-beetles.

Fig. 37. *a.* Bug (Hemiptera Heteroptera)

Fig. 38. Bug with wings expanded (Hemiptera)

Fig. 39. Ichneumon Fly (Hymenoptera)

2. *Club-horn* beetles with club-shaped antennæ. Most of these are beneficial. Among these are Rove-beetles, Burying-beetles, and Lady-bird beetles (Fig. 42).

3. *Saw-horn* beetles with saw-toothed antennæ. These are mostly injurious, and include the Wire-worms and Buprestid Wood-borers. (Fig. 43.

4. *Leaf-horn* beetles knobbed antennæ made up of many leaf-like parts. (Fig. 44). Most of these are injurious, and include the Rose-beetles, June bugs, and Stag-beetles.

5. *Plant-Eater beetles* with bead-like antennæ. (Fig. 45). All of these are injurious, and include the potato-beetle (Fig. 46), Flea-beetle, and Pea-weevil.

Among the *Snout* beetles (Fig. 47), are Plum-curculio, Grain-weevils, and Bark-beetles. Most are injurious.

The *Lepidoptera* are divided into the Moths, Butterflies, and Skippers, (Fig. 48). Their larvæ are caterpillars, and some are among our most in-

jurious forms. Such are the Tent Caterpillar, Army-worm, Cutworm, Peach-tree Borer, Cabbage-worm, Codling worm, Canker Worm, and Mediterranean Flour Moth.

The *Diptera* are two-winged, and include such insects as the Hessian Fly, Wheat Midge (Fig. 49), Mosquitoes, Craneflies, Robber-flies, Bot-flies, House-

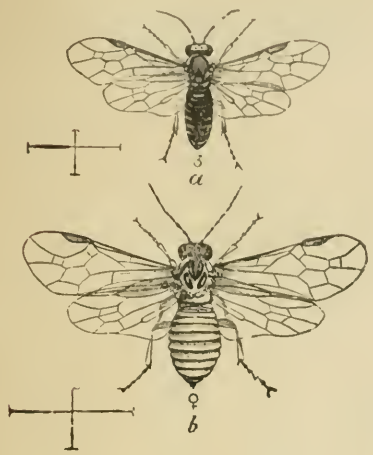


Fig. 40. Saw-flies: *a*. male; *b*. female (Hymenoptera)

Fig. 41. Tiger-Beetle.

Fig. 42. Lady-bird beetle.

Fig. 43. Saw-horn beetle (Buprestis).

Fig. 44. Leaf-horn beetle.

flies, Tachina flies, Syrphus flies (Fig. 50) and cheese flies. The Tachina and Syrphus flies are very beneficial.

The *Hemiptera* or *Bugs* are divided into the *True-bugs* (Fig. 51), the *Leaf-hoppers* and *Plant lice* (Fig. 52) and *Lice*. Nearly all are injurious, and frequently do much injury. They suck the juices from plants.

Fig. 45. Plant-eater beetle.

Fig. 46. Colorado Potato-beetle.

Fig. 47. Snout-beetle.

The *Orthoptera* are often divided into the *Jumpers*, the *Walkers*, the *Graspers*, and the *Runners*. The first includes the Grasshoppers, Locusts, Crickets; and the last the Cockroaches.

The *Neuroptera* comprise the Ant-lions, Lace-wings (Fig. 53), Dragon flies (Fig. 54).

Fig. 48. Skipper butterfly.

Fig. 49. Wheat-midge.

Fig. 50. Syrphus fly.

Fig. 51. True-bugs.

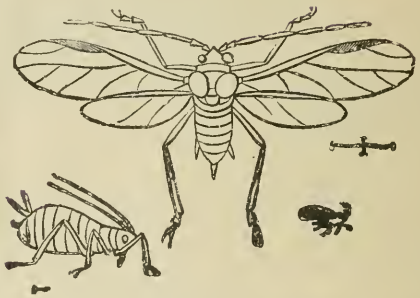


Fig. 52. Plant-lice (Aphis.)

Fig. 53. Lace-winged fly and its eggs on stalks.

Fig. 54. Dragon-fly.

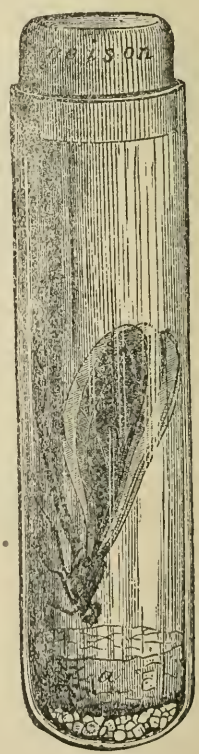


Fig. 55. Cyanide bottle

Collection of Insects. The best way to become familiar with the different insects is to make a general collection. This is but a means to an end, for a real knowledge of insect life can only be acquired by observation in the

Fig. 56. How to pin and label a beetle.

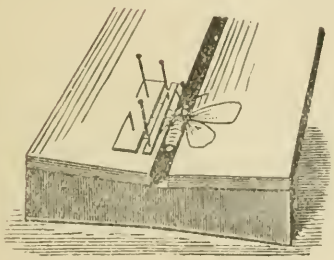


Fig. 57. Spreading-board.

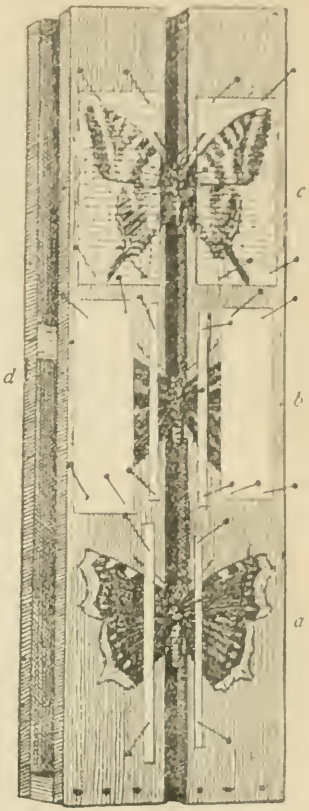


Fig. 58. Spreading-board.

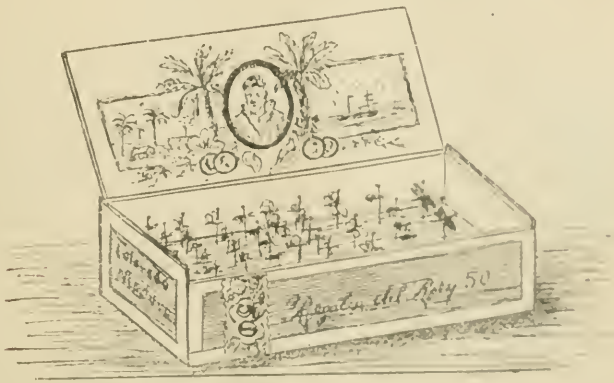


Fig. 59. Storage box for specimens.

fields. The insects should be watched during all their stages of growth, their food plants, and their habits noted.

The outfit for collecting is neither expensive, nor hard to prepare. It consists of (1) An *insect net* for catching the insects, made by sowing a bag of cheese-cloth to a stout ring, one foot in diameter, which is fastened to a broom handle; (2) A *cyanide bottle* (Fig. 55), for killing the insects, prepared by pouring some soft plaster-paris over a few lumps of potassium cyanide in a wide-mouthed bottle. When the plaster has set and the bottle corked, the whole is ready for use; (3) *pins* (Fig. 56) to mount the specimens; (4) Spreading-board for butterflies and moths (Figs. 57 and 58); (5) a *cigar-box*, lines with cork, or corrugated paper of the druggist's to hold the specimens. (Fig. 59).

When one considers the large number of injurious insects which attack the various crops, it is not surprising that the yearly losses amount to many millions of dollars. Of recent years, the Hessian Fly, the Pea-Weevil, the Clover-Seed Midge, the Wheat Midge, The San José Scale, the Codling Moth, and the Tent Caterpillar have been very active; and, in some sections of Ontario, many crops were complete failures by reason of their ravages.

Careful estimates of the probable losses have been made at different times by competent scientific men, and the conclusion was that the annual loss was about one-tenth the total agricultural product of the United States and Canada.

THE PEAR-TREE PSYLLA AND HOW TO DEAL WITH IT.

By George E. Fisher, Burlington.

Several instances of disastrous and even fatal effects to valuable pear orchards from being attacked by the Psylla have come under my observation, as well as entirely satisfactory results from treating the trees.

The life-history and habits of injurious insects must be accurately determined before we can know just how to deal with them. A knowledge of the habits of such insects will often enable the farmer to so manage his land and crops that the insects are placed under unfavorable and even destructive conditions.

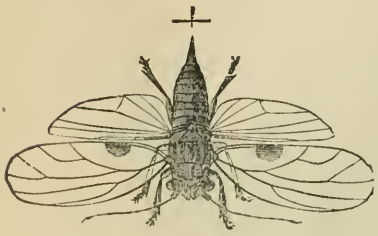


Fig 60.

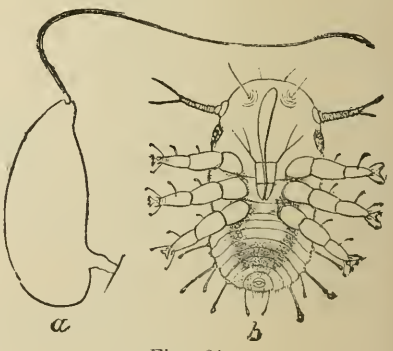


Fig. 61.

The Psylla winters in the full-grown or perfect state, a minute brick-red fly, about one-eighth of an inch in length. From the broad head the body tapers to a point at the caudal extremity. There are two pairs of large transparent wings, which when closed cover the body. The thighs are abnormally developed, which enables it to jump a long way; hence the name "Pear-tree Flea-louse." In form this insect is the counterpart of the Dog-

day Harvest fly (Cicada) in miniature (Fig.60). During the winter it secures shelter in the crevices of the bark on the trunks and large limbs of the trees, in nearby rubbish, or wherever it can find protection; hence the advantage of clean culture, in which case it will be confined to the trees. The small lemon-coloured eggs are laid about the middle of April, and hatch about the middle of May, according to weather conditions (Figure 61). There are probably four broods in a season. When the nymphs appear, if there be no foliage, they make their way into the opening buds. They secrete large quantities of honey dew, which frequently drips from the leaves, and gets over the whole of the tree and fruit, in which a black fungus develops.

There is difficulty in treating the Psylla during the summer. Except immediately following a heavy rain, the nymphs are usually so completely enveloped with honey dew that spray will not reach them, and the mature insects are so active that when spray strikes a tree they instantly fly away, and do not return until spraying is discontinued.

An ounce of crude petroleum in the proportion of 1 in 16 (1 gal. of petroleum in 16 gals. of emulsion), has in my experience proved the most satisfactory in case a treatment must be given in summer, but I would depend upon a very thorough application of lime and sulphur (lime 30 lbs., sulphur 20 lbs., in 40 gals. of wash, cooked two hours), made in March, to wipe out the pest. At this season there are no eggs. The overwintered adults are very sluggish, not at all like those of the summer broods, and these alone are present. If the wash be driven well into all of the cracks of the bark the destruction of the insects will be complete.

Lime alone will destroy Psylla perhaps as completely as with sulphur added, and will go a long way in cleaning off the black fungus, but lime alone will not destroy scale insects, and these are invariably present. Whether it be lime, or lime and sulphur that is used, the wash must be liberally applied, for it will not diffuse, but remains where it strikes the tree, and if the Psylla is to be killed it must be hit.

OBITUARY.

The Late John Alston Moffat.

Through the kindness of Mr. G. L. Johnston, President of the Hamilton Scientific Association, we are enabled to present our readers with an excellent portrait of our late friend and colleague, Mr. J. Alston Moffat, who died at the Victoria Hospital in London, on the 26th of February, 1904. For fourteen years he had been the Librarian and Curator of the Entomological Society of Ontario, and endeared himself to all with whom he came in contact by his kindness and courtesy. It was always a pleasure to him to identify specimens, and to exhibit the beautiful objects in the Society's cabinets to anyone interested in natural history. He was a frequent contributor to the *Canadian Entomologist*, and to these Annual Reports. In the last volume (the 34th Annual Report, 1903, page 103) will be found an interesting account of his "Recollections of the Past," which contains reminiscences of his life and relates how he came to study entomology.

"Mr. Moffat was born on the family estate of Milton, about three miles from the city of Glasgow, Scotland, in the year 1825. Through business misfortune his father lost his wealth and removed to Glasgow, where he en-

gaged in mercantile pursuits. Not liking city life, he came to Canada by himself, proposing to find a home for his family in this new country. Soon after he left Scotland, his wife—Mr. Moffat's mother—died; he at once sent for his family, who landed at New York on July 1, 1836, and settled in the Township of Nassagaweya; there the father married again. This homestead is still in the possession of the only son of that marriage. After a time John's eldest brother took up land and settled in the township of Binbrook, and there John Alston made his home for some years.

"After a time he came to Hamilton and engaged in business as a merchant tailor, but being in indifferent health he was in the habit of taking long walks in the open country as a relaxation from business. It was during these walks that he formed those habits of observation of the insect life which he saw around him, that shaped all his future career. He found so much enjoyment in the capturing of insects and observing their life history, and became so absorbed in the science of Entomology, that in spite of much good natured ridicule from his friends, he gave up his city business altogether and 'going from bad to worse' as he expressed it, devoted his whole time to the study of insect life.

"He soon became well-known to all the entomologists of Canada, as well as to many in the United States, and was a most industrious collector of specimens. His habits of observation were exact, and as a result he found a new species of moth which was named *Scopelosoma Moffatiana* in his honour by Mr. Grote, an Entomological expert. It is figured in Dr. Hollands's Moth Book," plate xxvi. fig. 33, and is called by him 'Moffat's Sallow.'

"He was a nephew of the well-known Dr. Moffat, who was surgeon to Wellington, during the conflict with Napoleon, and also of Bailie Alston, a well-known philanthropist of Glasgow. Mr. Moffat was a man of quiet and retiring disposition, and at his death in his eightieth year, was as straight of body, and clear of mind as in his youth. He passed away honoured and respected by all who knew him as a friend, and this society and the one with which he was most intimately connected are all the poorer from his loss."

Mr. Moffat's first contribution to these Reports was made in 1880, when he furnished a short account of an assembly of Archippus butterflies that he had observed. This was followed by "Collecting Notes" in each of the next three volumes. In 1884 and 1886 two papers appeared from his pen on the habits of Ant-lions. From this time on, he became a regular contributor; the following are the more important of his papers; "Species, Varieties and Check-lists" (1887) and "Some thoughts on the Determination of Species" (1889), "Origin and perpetuation of Arctic forms" (1890); "The power of Insects to resist cold" (1892); "A microscopical examination of an unexpanded wing of Callosamia promethea" (1891); this became a special subject of interest to him and led to papers "Remarks on the structure of the undeveloped wings of the Saturniidæ." "Growth of the Wings of a Luna Moth" and "The Wing-structure of a Butterfly" (1894-1899); "Mosquitoes" (1893); "A reappearance of Pieris protodice" (1894); "Variation with special reference to Insects" (1895); "Value of Systematic Entomological Observations" and "Protective resemblance" (1897); "Random Recollections" and "A bit of History" (1898); Observations on the Migration and Hibernation of the Archippus Butterfly (1900-1901); "A talk about Entomology" (1892), and his "Reminiscences" in 1903 already referred to. He also contributed "Notes on the Season" every year from 1895 to 1902. Though he never had any educational advantages, he was an interesting writer, and often displayed much thought and accurate powers of observation. C. J. S. B

INDEX.

PAGE.

Anasa tristis 11, 55
Anosia plexippus 7
Aphodius erraticus 16
Apple leaf-sewer 28
Aquilegia borer 31
Arsenical compounds 40
Ashmead, Dr. W. H., elected an honorary member 47
Asparagus beetles 51
Autographa Californica 48
" flagellum 48
" fratella 48
" iota 48
" on 48
" rubidus 48
Basswood, or Linden, insects 78
Beet-leaf miner 52
Bethune, C. J. S., articles by 23, 109
Blueberry, gall on 96
Book Notices 57
Bot-flies of Rabbits 33
Buffalo Carpet-beetle 32
Cabbage insects 4, 29, 50, 51, 52
Cacœcia fervidana 94
Caprifig insect 39
Carrot Rust-fly 29, 53
Cecidomyia verrucicola 79
Cereal crops, insects injuring 49
Chenopodium album, insects attacking 26
Cicindela echo 43
" pseudosenilis 43
" tenuicincta 43
Cicindelidæ, notes on Canadian 73
Cimbex Americana parasite 18
Clisiocampa fragilis 26
Clover-seed Midge 50
Clythanthus ruricola 80
Cockle, J. W., article by 86
Cockroach, a southern, in Canada 76
Codling Moth 54
Coleophora tiliæfoliella 79
Coleoptera, captures in 1904 73
Collectors of insects in Canada 60
Columbine borer 81
Cotton Boll-weevil 37
Currant, insects affecting 29, 30
Cuterbra cuniculi 33

PAGE.

Cutworms 4, 51
Dahlia stalk-borer 31
Diapheromera femorata 5, 78
Dichelonycha elongata 78
Diptera, captures in 1904 77
Ellida caniplaga 79
Eulecanium quercitronis 80
Eupsalis minuta 80
Evans, J. D., article by 82
Evergestis straminalis 4
Fisher, G. E., article by 7, 108
Fletcher, J., articles by 49, 56
Fulgoridæ, Catalogue of: Swezey 58
Fyles, T. W., articles by 16, 91, 94
Galls and their makers 94
Garden insects 29
Geometridæ, notes on 66
Gibson, A., articles by 78, 81
Gluphisia, septentrionalis 79
Grant, C. L., article by 4
Guelder Rose Aphis 54
Harris, E. D., notes on Cicindelidæ 73
Hemerocampa leucostigma 5
Heterocampa bilineata 79
Hibernia tiliaria 26
Hollyhock borer 30
Household pests 32
House-plant insects 55
Hymenoptera, Food-habits of 94
Insect Names and Lists 87
Insects, elementary study of 96
Insects, outfit for collecting 107
Ithycerus noveboracensis 92
Kearfott, W. D., on Micro-Lepidoptera 71
Lecanium cerasifex 54
Lepidoptera, captures in 1904 61
Lepidoptera of Kootenai District, B.C.: Dyar 57
Light, Insects collected at 82
Lime and sulphur treatment 8, 9, 10, 34, 40, 53
Lithocolletis hamadryella 94
Lochhead, W., articles by, 27, 33, 35, 96
Malaria Mosquitoes 38, 39
Micro-Lepidoptera, notes on 70
Mites in flour 32
Moffat, J. A., memoir of 109

	PAGE.
Mosquitoes	38
" Books on	58, 59
Oak, insects affecting	91
Onion maggot	4, 5, 29, 50
Orchard insects	27
Ottolengui, Dr., letter from	48
Panchlora viridis	76
Papaipema purpurifascia	81
Paragrotis messoria	4, 51
" ochrogaster	4, 51
" scandens	51
Parasitic insects, value of	36
" " importation of	37
Pear-tree Psylla	10, 108
Pea-weevil	8, 10, 49
Pegomyia bicolor	52
Phoxopteris nubeculana	28
Phytoptus abnormis	79
Pieris rapæ	52
Powder Post beetle	32
Primula Spring-tail	31
Prionoxystus robiniæ	92
Prionus laticollis	92
Psila rosæ	29, 53
Red Spider	9, 56
Rennie, R. W., article by	9
Root maggots	50
San Jose scale	8, 33, 53
Spring-tail insects	31
Scale insects	54, 55
Squash-bug	11, 55
Stevenson, C., article by	90
Strawberry weevil	30
Synchroa punctata	80
Taylor, G. W., notes on Geometridæ	66
Telea polyphemus, Spinning methods	86
Tent caterpillars	5, 9, 26, 55
Tineid Moths from B.C.: Busck	58
Tussock moth	5
Vespa diabolica	17
Walking-stick insects	6, 78
Wasps	17
Wickham, H. F., article by	42
Williams, J. B., articles by	5, 87
Willow galls	94
Willing T. N., article by	25
Wire-worms	10, 18, 29
Young, C. H., article by	3

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